Engineering News, November 23, 1961

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ENGINEERING NEWS

THE NEWSPAPER OF INDUSTRY • A HEYWOOD PUBLICATION

No. 8 November 23, 1961

Registered at the G.P.O as a newspaper

Trims mild steel, cast iron, hard plastics, gun-metal, etc
INDUSTRIAL TOOL with the New 'Blue' Blade by SURFORM
Blade an invention of Firth Brown Tools Ltd. 144 SU

Every Thursday, Price 4d

Call for watch-dog council: Hailsham aims to pep-up research

IMPORTANT DEVELOPMENT CONTRACTS ARE EXPECTED

Man-powered flight

TWO PEDAL-PLANES ARE AIRBORNE

The Southend Group's aircraft will be a two-seater.

TWO GROUPS in the running for a £5,000 prize have managed to fly man-powered aircraft this week for short periods.

First were Southampton University graduates with a 70-yard flight; the second (over 180 yards) was made by a Hatfield club.

For some time, groups of aeronautical enthusiasts have been working to develop aircraft by muscle power alone. As an added incentive Mr. Henry Kremer, an industrialist, has offered a prize of £5,000 for the first successful flight of a man-powered aircraft, designed, built and flown within the Commonwealth. Conditions are laid down by the Royal Aeronautical Society.

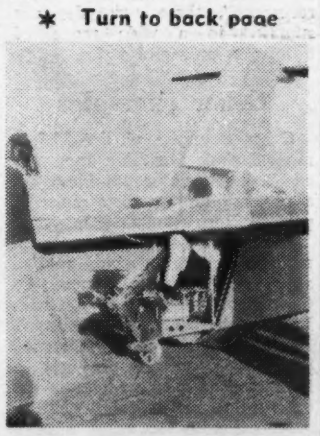
Two-seater

These are: that the aircraft must fly a figure-of-eight course with turning points at least half-a-mile apart, and height must be not less than 10ft. at beginning and end.

Such attempts must be made under the scrutiny of Royal Aero Club observers.

Three groups have been accepted. They are based at

✱ Turn to back page



Southampton's machine has a pusher-propeller system.

Automatic machine tool control likely to have priority

IMPORTANT Government development contracts, designed to encourage industrial research, are expected to be announced next month. These lie behind the statement of Viscount Hailsham in the House of Lords, recently, that it is time for a shake-up in research associations.

For some time now, the Minister of Science (Lord Hailsham) and the Department of Industrial Research (DSIR) have been investigating the use made of these associations by their supporting industries.

The contracts are one of two ways the Government is able to encourage research—promoting special lines of progress.

The second lies in the powers of the Minister for Science to impose a levy on supporting industries to extend the activities of research associations.

More resources

The recent debate on the importance of making full use of technical manpower and of devoting more resources to research in industry was opened by Viscount Caldecote.

He said that each industry and company should analyse its own performance to see whether it required more research and was making the best use of available knowledge.

Most research was being carried out by industry, he said, but that the amount of money spent on this compared unfavourably with that spent on advertising.

Lord Caldecote suggested that a public scientific committee should be appointed to investigate whether resources were being adequately used.

Great needs

Lord Hailsham, replying, said he saw two great needs in certain British engineering and other industries.

The first was that industry should be based on advanced technology so that it might keep ahead of its competitors.

The second was that the traditional craft industries should no longer be craftsmen based but should employ technologists with a more flexible outlook

He said the DSIR had received authority to proceed with two major projects.

This referred to the two contracts, soon to be announced. It is believed that at least one will be concerned with the development of electronic methods of automatic machine tool control.

ALUMINIUM CABLE FACTORY

THE first factory to produce Solidal cable—an aluminium cable of new design—is shortly to be opened by the Aluminium Wire and Cable Co. at Port Tenneant, Swansea.

The cable is suitable both as a three-phase l.v. distributor cable, or as a three-phase, three-conductor cable for balanced loads.

The current range is 100-400 amp. with a rating of 1.1 kV.

The laid-up cores are wrapped with clear p.v.c. tapes which form the bedding for the fourth conductor consisting of a concentric layer of flat armour wires.

WESTINGHOUSE DEVELOP 'EXOTIC' ALLOY

COLUMBIUM alloys that can be forged, rolled, sheared, and handled directly, often at room temperature, have been developed by scientists at the U.S. Westinghouse research laboratories.

The processing of alloys of the "exotic" metals usually must be carried out at high temperatures and in an inert atmosphere, or within the protective cladding of a less active metal.

The new alloys require such protection only during melting and hot-forming. Simple, inexpensive, well-known processing techniques are used thereafter.

Compared to most refractory metals, the columbium alloys are light in weight, with a density about equal to stainless steel.

Conditions of flight

Yet they can operate at temperatures in the range of 1,800 to 3,000°F. or about 1,000 degrees above the operating temperatures of such steels.

Three of the alloys are being placed into pilot plant production at the Westinghouse materials manufacturing department, Blairsville, Penn.

First to be produced will be a columbium-vanadium alloy called B-33. This may be easily fabricated and has unusual resistance to corrosion by liquid metals.

One application immediately being considered for B-33 is in the heat exchangers, or radiators, for space craft.

The two additional columbium alloys to be pilot produced are B-66 (a columbium, vanadium, molybdenum, zirconium alloy) and B-77 (a columbium, tungsten, vanadium, zirconium alloy).

NUM change their name

THE name of the National Union of Manufacturers has been changed to The National Association of British Manufacturers.

This has been made in order to give a lead to manufacturers and industry generally to meet the challenge of the Common Market and to think of Europe as an extension of the home market.

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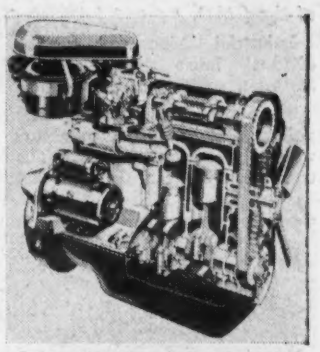
Belt drive catches on

Aid to engine design



Cut-away section of the Goggomobil 993 c.c. engine showing Power Grip toothed belt camshaft drive.

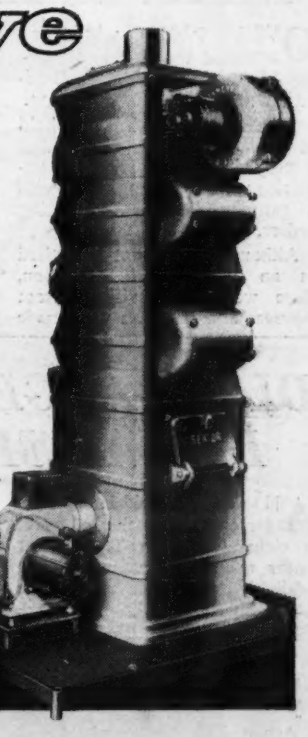
HIGH-TENSILE steel wire belts moulded in neoprene for camshaft drives are finding increasing favour with manufacturers.

The Power Grip belt was developed and patented by the U.S. Rubber Co. and is now produced in this country by the North British Rubber Co. of Edinburgh.

The helically wound high tensile cabled steel wire, with its moulded neoprene sheath has a tooth form on the inner face of the belt. This engages on axially grooved pulleys. The constant phase relationship between driver and driven shaft is maintained without belt elongation.

No tensioner or lubrication is required and the belt can operate without a cover.

Tangye
AUTOMATIC HEATING UNIT
Requiring the minimum of attention or maintenance, the Tangye automatic oil-fired heater is a most efficient and economical method of space heating. Three safety devices are incorporated which automatically come into operation in the event of either flame, electricity or fuel failure. Automatic re-start is by spark ignition on the restoration of supply. A thermostat is fitted and can be set to provide just the amount of heating required.



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'Engineering needs the industrial designer'

Design training systems should be introduced, says CoID man

Report of the last day of the Engineering Materials and Design Conference at Earls Court.

SOME engineers view the emergence of the industrial designer a little doubtfully but the higher degree of engineering specialisation that is coming about will make the whole design process even more a matter of teamwork than it is now.

This was the view put forward at the engineering and materials design conference at Earls Court, which closed on Friday, in a paper by Mr. W. H. Mayall of the Council of Industrial Design. It was read by Mr. Gardiner-Medwin, also of the CoID.

Industrial design work can be divided into three aspects: aesthetic, social and ergonomic.

These merge together at many points and are interconnected with engineering aspects. The connection between them is that they are each concerned with the impact which a product will have on the user.

The "engineering designer" will become more and more a composition of experts whose strength would largely depend on each member's ability to understand one another and to co-operate.

This type of development makes design organisation a most important factor in modern engineering.

It is also contributing to the need for serious studies of design methods which might assist the introduction of engineering design training systems.

It is impossible to say whether or how much industrial design training could be included in these systems until more research was done into the future of design in engineering, the paper said.

The present and continuous shortage of engineers and technicians shows only too clearly that design resources are not unlimited.

Delegates heard over 20 papers covering a wide variety of materials and their development.

In a paper The Case for Steel Castings, Mr. F. Clymer of F. H. Lloyd and Co. said that steel castings possessed characteristics which could be turned to good advantage if properly harnessed by apt design, and there was a positive case for their use in certain applications.

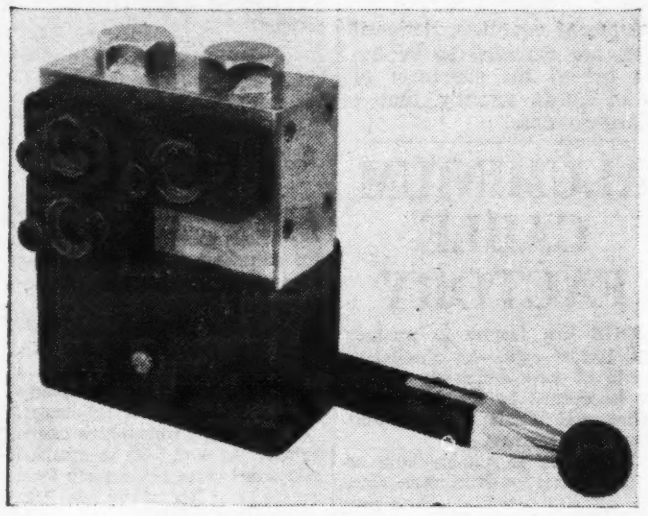
One of the distinctive characteristics of steel castings is that they are isotropic, and consequently free from directional variation in physical properties.

Direction of working

Wrought steels do not possess the same properties in all directions. Ductility, impact and fatigue properties are considerably less in a test specimen taken at right angles to the direction of working, than in one taken parallel with it.

He mentioned that it is important for the design-engineer to appreciate that quite often values are quoted for properties of wrought materials, which apply only in the direction of working.

This fact is important when considering a component which is expected to accommodate alternating stresses, or to absorb shock.



Hydraulic valve manufactured by George Ellison before (left) and (right) after design changes.

Condenser produced as two die-castings in zinc alloy.

Mr. Clymer mentioned casting defects and said that there is no engineering or metallurgical reason why welding, correctly applied, accompanied by appropriate heat treatment, should not be regarded as a normal means for dealing with casting imperfections.

Failures due to steel castings were usually less frequent than those due to other forms of manufacture.

Quality castings of complex design were not cheaply produced, but the alternatives which in some instances were available might involve many hours of machining time or an angular and wasteful design.

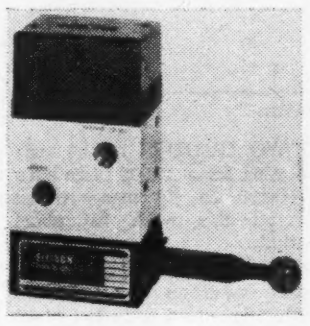
Low temperatures

Steels for the Design of Low Temperature Equipment was the subject of a paper by E. T. Gill, alloy steels development officer, International Nickel Co. (Mond).

He said the most important change induced by falling temperature was the increasing readiness of ferritic steel to fail in a brittle manner.

This was recognised by the "crystalline" appearance of the fracture itself.

It had been found by experiment that the tendency of steel to fracture under impact in falling temperatures was steadily lowered as the carbon content decreased.



A well-made steel free of alloys, with low carbon content, could be used successfully in environments down to −50 degree C.

In the case of nine per cent nickel steel, welding still presented a problem. Electrodes of matching composition had not yet been developed with the same strength properties of the nickel steel at very low temperatures.

Diecasting

Mr. H. K. Barton, consultant, in his paper Designing for Diecasting, said diecasters generally found it easier to reach accommodation with design engineers than with stylists.

Engineers, he found, would accept radical changes in the design of a component provided it would still do its job and fit into the available space.

The flexibility of the diecasting process, he said, was both an advantage and a liability.

It was an advantage, since components produced by almost any of the other precision processes could be converted to diecasting without any change of form.

It was a liability because conversions to diecasting were, in consequence, frequently made in an arbitrary manner without consideration of the further advantages that might result from a complete reappraisal of the product and its redesign specifically for diecasting.

Engineering Materials and Design Exhibition

MANY INQUIRIES FROM OVERSEAS

More than 17,000 visitors at second-year show

OVER 17,000 visitors attended the 2nd Engineering Materials and Design Exhibition at Earls Court, London.

Like the first Exhibition held in 1960, exhibitors found that a very high proportion of enquiries were from engineers with a genuine interest in placing orders.

Although it was not advertised as an international exhibition, there were many visitors from overseas and enquiries were made by engineers from France, Holland and Switzerland.

Investment castings by the Picast process were shown by P.I. Castings (Altrincham) Ltd. Designed to minimise machining operations for long or short production runs, P.I.C. have made this form of casting a speciality and can produce components ranging from a fraction of an ounce to several pounds in weight.

The Picast process differs from other methods of investment casting in that the investment material is applied directly to the max patterns without the conventional pre-coating of fine refactory; and the moulds are rotated during pouring, with the result that the molten metal enters each cavity under centrifugal force.

The directional solidification, proceeding from the outer end of the casting towards the mould centre assists in promoting soundness of structure.

An eye-catching display of expanded metal and plastic coated expanded metal was given by The Expanded Metal Co.

Plastic coatings on expanded metal will generally outlast other finishes in humid and corrosive conditions and needs no maintenance apart from an occasional wash down.

Expanded steel meshes coated in nylon, p.v.c., polythene, and other finishes are available.

Carter Gears, showed their new 40 h.p. AL50 hydraulic variable speed gear which was on view for the first time. This is the largest size in their current range and the recently introduced 10 h.p. type AM26 was shown as a working unit.

A ventilation smoke tube assembly for detecting the speed and flow of slow moving air currents was shown by the Mine Safety Appliances Co.

The firm also featured a new range of attractively styled spectacles for eye protection. Designed to eliminate "worker-resistance", these spectacles are supplied in a wide range of fittings, colours and styles.

Other examples

Other examples of the M.S.A. range include breathing apparatus and a combustable gas indicator, a new addition to their range of portable instruments.

Metal strip with pleasing non-metallic surface coatings applied as a finish were displayed by Coated Strip, (in association with Litho Strip Corpn., Chicago). Available in smooth or embossed p.v.c., this coating is not a laminate but is poured on to the base metal and baked.

Adhesion to the metal is of a high order, and components can be pressed into single and double curvature without leaving marks from the dies.

It is not cold to the touch, and opens many possibilities to the enterprising designer with its combined structural strength when bent into the form of angle or channel sections. It has a wide range of colours and patterns which include wood-grain finishes.

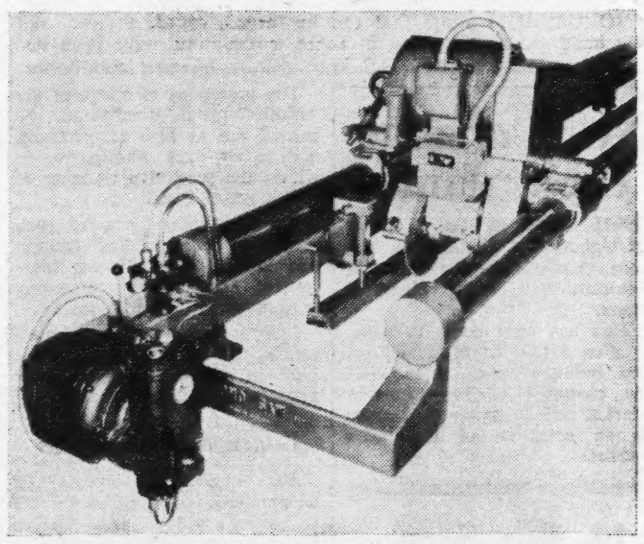
Supplied with base metal of mild steel or aluminium in various tempers, the range of thickness is from 0.006 to 0.040in., with a maximum width of 18in.

A similar material is "Brymill" supplied by British Rolling Mills. This is a plastic coated steel strip which is a laminate of mild steel bonded to a thin, hard, and semi-rigid p.v.c. foil which can be bent, lock seamed, roll formed, deep drawn, and welded, both plastic-to-plastic and steel-to-steel.

New electrolytes for the deposition of platinum, palladium, rhodium, ruthenium and gold are available from Englehard Industries.

Some of these solutions give slightly porous deposits enabling continuous deposition to take place resulting in the build-up of relatively thick deposits.

After plating, these deposits may be sealed so that a virtually non-porous deposit of useful thickness is finally obtained.



Portable sawing apparatus with hydraulic clamping for sawing wood up to 2in. thick. It is manufactured by Doust & Monk, West Norwood, London.

DIAL GAUGE MEASURES LINEAR MOVEMENT

AN accuracy within 0.001in. for every six inches of travel is claimed for the Trav-A-Dial linear measuring instrument now available in the U.K. from Apwar Ltd., Sheen Road, Richmond, Surrey.

The manufacturers are Southwestern Industries Inc. of California, U.S.A.

Actuated by a gauge wheel contacting a machined surface, the indicator measures linear movecent in thousandths of an inch on the main dial and inches and tenths on a secondary dial.

The unit is designed for use on machine tools to provide a continuous indication of carriage, slide or tool position in relation to a workpiece; and is applicable to mechanisms where lineal movement of one component needs accurate assessment and control in relation to another.

The manufacturers claim vigorous life cycle tests based on traverse lengths of 40 miles—equivalent to an estimated five-years' use on a machine tool.

Practical conditions were simulated including sudden stops, fast acceleration and rapid traverse.

WANTED: SILENT POWER

BY OUR PARLIAMENTARY CORRESPONDENT

READY sales in every country await the manufacturer who can produce a silent but powerful aero engine.

Mr. Christopher Woodhouse, Parliamentary Secretary to the Ministry of Aviation, made the point in the Commons last week during a debate on the problem of aircraft noise. He stressed that finance was not the difficulty in solving the problem of making air engines less noisy. The long and short of the matter was that at the moment nobody knew how to do it.

It looked, on present information, as though the by-pass and ducted fan engine, now beginning to come into service, would be eventually developed to a point where the jet velocities were low enough to reduce the noise.

* * *

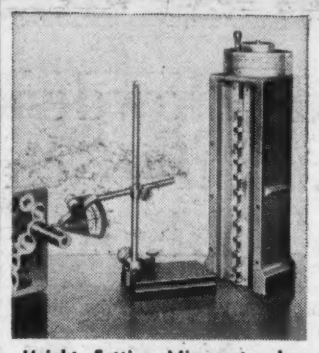
Tenders for equipment and rolling stock for the Swaziland railway project would be called for as soon as practicable, said Mr. Bernard Braine, Commonwealth Relations Under-Secretary, expressing the hope that British suppliers would tender.

About 140 miles of track would be required, about 400 general purpose wagons, and signalling equipment.

* * *

Giving a few examples of the value of research and development during a Lords debate. Viscount Caldecote pointed out: computer speeds had increased more than 100 times in six years; a simple material like cast iron had been increased in strength three times; jet engines at first had a thrust of about twice their own weight, and were in sight of thrusts of about 16 times their own weight; in 15 years power station efficiencies had risen by some 10 per cent.

British high precision goes on show in Budapest



Height Setting Micrometer by Coventry Gauge & Tool for surface tables and machine beds.

FIVE of the leading British producers of high precision measuring equipment and engineers' tools are showing a wide range of products in a specialised exhibition which opens in Budapest on November 29.

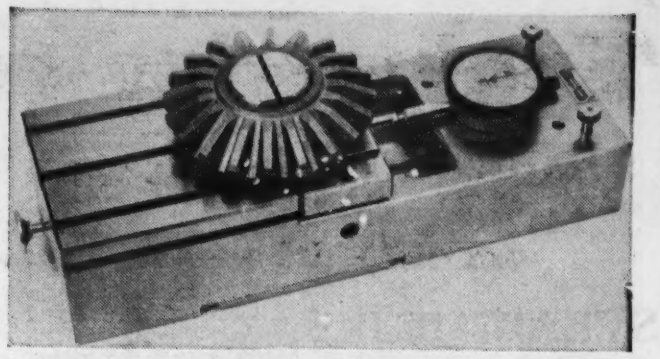
Including the Sigma Instrument Co's. Dialair (a calibrated pneumatic comparator) especially valuable in quality control, the special Cardinal Counterbores of the Brooke Tool Manufacturing Co. and the metrology version of Hilger and Watts Autoset Level, the exhibition will give Hungarian engineers and scientists an excellent idea of the tools which the exhibitors are developing for British and overseas industries.

The companies taking part in the Budapest exhibition are: British Indicators, Brooke Tool Manufacturing, Coventry Gauge and Tool, Hilger & Watts, L. M. Van Moppes, and Sigma Instrument Co.

Their participation is through BESTEC, the British Engineers Small Tools & Equipment Co., a 16-year-old organisation set up by manufacturers in the high precision measurement field for the advancement of exports.

Important

A further company of importance to the exhibition is Joseph Gillott, of Sheffield, whose tool steels are used by certain of the firms concerned.



Checkmaster Bench Comparator by British Indicators set up for checking.

The special value of the exhibition to Hungarian manufacturing concerns, as to others in the Eastern European states who may send representatives, is the comprehensive range of products the BESTEC members are able to offer.

At home and overseas the fields of their applications include industrial spectroscopy in metals, aircraft construction and aero-engines, the manufacture of scientific equipment, atomic energy work, nuclear physics, chemical engineering, radar and navigational aids.

Some of the exhibitors are not new to supplying the Communist countries. Coventry Gauge and Tool, selling three-quarters of a million pounds worth of specialised machine tools to the USSR and others to Poland may expect their name to be well known.

The variety of exhibits on show in Budapest will go a long way to gaining the objective of BESTEC in staging the show — to give Hungarian engineers a chance to see a select display of British precision engineering products and to discuss them with the appropriate technical representatives.

LEARN TO FLY—IN MINUTES

TEN men with flying experience ranging from nil to high proficiency have learned in a matter of minutes to fly a one-man "flying platform", according to a recent report issued by the U.S. National Aeronautics and Space Administration.

The report shows that the men seldom need more than ten minutes practice before taking-off on short tethered flights.

While one man said that he preferred to guide the platform by shifting his weight, all the others preferred a control stick that diverted compressed-air streams from four platform-mounted jets.

The jets were fixed in a neutral position in the steering-by-balance method.

Engineers issued one warning: air turbulence caused by the platform's two propellers and jets in a confined space, or close to obstacles in the field, can cause yaw control problems with either steering method.

Engineers solve space gyroscope problem

AFTER several years of experiment at AC Spark Plug, the electronics division of General Motors, the effects of oxidation in gyroscopic instruments used in inertial guidance systems for ballistic missiles have been overcome.

Since the gyro is considered the heart of an inertial guidance system, this development is expected to increase reliability.

Research engineers discovered that even the presence of infinitesimal amounts of oxygen in bearing lubricants could seriously damage a precision gyroscope.

Bearings stick

Organic lubricants available are not completely oxygen resistant. The result was a deposit of a varnish-like material on gyro bearings with organic lubricants.

The sticky, viscous material collects on precision ball bearings mounting the gyro wheel. These wheels run at a speed of 12,000 r.p.m. and higher, and can only be given a minute quantity of lubricant.

One milligram moving one centimetre is sufficient to corrupt the instrument's operation. Weighing experiments have shown that the extent of deposits measured about 0.045 milligrams — enough to cause failure.

To lick the problem the gyro is put into an almost perfect vacuum that is equivalent to atmospheric conditions 100 miles from the earth in outer space.

The chamber is then filled with a "purified" helium. Helium is used because of its inherent capability to cool the rapidly spinning gyro wheel and because of its low friction quality.

Despite the apparent purification of helium, it is still loaded with enough oxygen to raise havoc with the bearing lubricant. Also, oxygen molecules have been absorbed by the materials used in making the gyro.

Research engineers decided the fastest and most economical way to get rid of the oxygen was literally to burn it out. The recent development work has been directed toward perfection of present tools and methods to accomplish this, and then proving them and their performance on actual gyro bearings.

The exact figure regarding increased gyro life is classified, but it has been revealed to be in a range of three to four times greater than it was.

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STANDARD SIZES

Also STAINLESS in selected sizes

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1.26	.79	.22	2.59	10—15						1.26	.63	.30	3.19	11—15
1.42	.98	.20	2.78	9—13	1.42	.79	.30	3.71	12—17	1.42	.63	.37	4.31	11—15
1.57	1.10	.22	3.38	9—13	1.57	.98	.28	4.04	11—16	1.57	.79	.37	4.97	9—13
1.77	1.26	.24	4.15	10—14	1.77	1.10	.32	5.14	7—11	1.77	.79	.46	6.72	10—14
1.97	1.42	.26	4.99	10—14	1.97	1.26	.33	6.11	9—13	1.97	.98	.46	7.79	8—13
2.20	1.57	.30	6.36	9—13	2.20	1.42	.37	7.59	7—11	2.20	1.10	.51	9.74	10—14
2.48	1.97	.22	6.09	9—13	2.48	1.57	.42	9.81	12—17	2.48	1.26	.57	12.2	7—11
2.80	2.20	.26	7.86	12—17	2.80	1.77	.45	12.5	9—13	2.80	1.42	.64	15.5	12—17
3.15	2.48	.30	10.1	11—16	3.15	1.97	.52	16.1	8—13	3.15	1.57	.69	19.9	10—14
3.54	2.80	.33	12.7	11—16	3.54	2.48	.47	17.1	8—12	3.54	1.97	.69	23.2	8—12
3.94	3.15	.35	14.9	13—18	3.94	2.80	.50	20.6	9—13	3.94	2.20	.76	28.4	7—10
4.17	3.15	.45	20.0	10—14	4.17	2.80	.61	25.7	7—11	4.17	2.20	.87	33.5	8—13
4.41	3.54	.38	18.4	10—15	4.41	3.15	.56	25.5	7—11	4.41	2.48	.85	35.5	8—12
4.65	3.54	.48	24.1	8—11	4.65	3.15	.66	31.2	6—9	4.65	2.48	.95	41.3	7—10
4.92	3.94	.43	23.3	8—12	4.92	3.54	.61	31.2	6—9	4.92	2.80	.94	43.9	6—10
5.20	4.17	.45	25.7	7—11	5.20	3.54	.73	38.6	7—11	5.20	2.80	1.06	51.3	5—8
5.51	4.41	.48	29.2	6—9	5.51	3.94	.69	39.8	7—11	5.51	3.15	1.04	54.7	5—8
5.91	4.92	.43	28.5	10—14	5.91	4.17	.76	46.6	6—9	5.91	3.15	1.21	66.7	4—6
6.30	5.20	.48	33.9	8—12	6.30	4.41	.83	54.1	5—8	6.30	3.54	1.21	72.6	3.5—5.5
6.69	5.51	.52	38.5	7—10	6.69	4.65	.90	62.0	4—7					
7.09	5.91	.52	41.0	6—10	7.09	4.92	.95	69.2	3.5—6					
7.48	6.30	.52	43.5	2.5—4	7.48	5.20	1.00	77.3	2—3.5					
7.87	6.30	.69	59.7	2.5—4	7.87	5.51	1.04	84.7	1.5—3					
8.35	6.69	.73	66.5	2.3—4	8.35	5.91	1.07	92.7	1.5—3					
8.82	7.09	.76	73.9	2—3.3	8.82	6.30	1.11	102.1	1.5—2.5					
9.29	7.48	.80	81.3	1.5—2.5	9.29	6.69	1.14	110.9	1.3—2					
9.84	7.87	.87	93.4	1.5—2.5	9.84	7.09	1.21	125.0	1.3—2					

Tolerances

On outside diameter:
For O.D. max. 2": + 0.039" — 0
For O.D. over 2": + 2 % — 0
On inside diameter:
For I.D. max. 2": — 0.039" + 0
For I.D. over 2": — 2 % + 0

Eccentricity

	6—15 %	15—24 %
Series 1	O.D. max. 2.2"	O.D. 2.5" and over
Series 2	O.D. max. 2.5"	O.D. 2.8" and over
Series 3	O.D. max. 2.8"	O.D. 3.15" and over

Mechanical properties

Normal delivered properties:

Yield point:	abt. 50 000 psi
Tensile strength:	abt. 78 000 psi
Elongation:	abt. 20 % on $11.3\sqrt{A}$
	abt. 27 % on $5.65\sqrt{A}$
Brinell hardness:	abt. 165

After tough hardening*
(wall thickness max. abt. 1.2")

Yield point:	abt. 71 000 psi
Tensile strength:	abt. 92 000 psi
Elongation:	abt. 15 % on $11.3\sqrt{A}$
	abt. 20 % on $5.65\sqrt{A}$
Brinell hardness:	abt. 200

*Water quenching from abt. 860°C, tempering at abt. 600°C.

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corresponding BSI En 6

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Letters to the Editor

DESIGNING THINGS TO WEAR OUT

PRODUCTS deliberately designed for a limited life have been on the increase for some years, with the avowed purpose of safeguarding the wheels of industry from grinding to a halt due to the products outlasting the lives of the purchasers.

The Germans are now producing drawing instruments to this specification, presumably for designers of other short-lived products. This raises a nice point.

What happens when the designers' instruments wear out before they have finished designing things to wear out?

F. E. CHASEMORE
16 Pooley Avenue,
Egham,
Surrey.

Articulated transport

YOUR article, "Roller Speeds Loading" of November 9, gives me the impression that some transport managers have never considered articulation.

The system illustrated has its good points, but cannot compare with articulation. The amount of space wasted by this system is considerable, because two trailers can be loaded instead of one. The cost of equipping the vehicle must approach that of a light semi-trailer, and the life of the trailer is 3-4 times that of a rigid vehicle.

G. E. WOOLDRIDGE
M. & G. Wooldridge,
High Street,
Lye,
Worcestershire.

Please cut out this page with the compliments of Sandvik Swedish Steels

PEOPLE in the NEWS

IT has been announced that **Lord Plowden**, a vice-chairman of Tube Investments, is to succeed **Sir Ivan Stedeford** as executive chairman on January 1, 1963. On that date, Sir Ivan will become the company's first life president.

Sir Ivan intended retiring next January on reaching the age of 65, but has agreed to continue in office as executive chairman, at the request of the directors, until the end of 1962 and then to serve as a non-executive director. Sir Ivan began work as a sixteen-year-old Vickers apprentice.

Lord Plowden is also chairman of British Aluminium and an Old Boy of the company. Originally, he joined between two periods of government service in wartime aircraft production and as Sir Stafford Cripps's chief economic planner.

☆

It is announced by A.E.I. that **Mr. H. Diggle**, consultant for the engineering department at the Wythenshawe works of the Transformer Division, has retired after forty-six years' service.

☆

The Plessey Company, Ltd., announces the appointment of **Mr. R. Hall** as divisional general manager of a total of four divisions and associate companies within the Plessey Swindon Group.

Lord Plowden will be executive chairman of Tube Investments

These comprise the Units and Parts Division and Sheet Metal Unit of the Plessey Company, Ltd., as well as Power Auxiliaries, Ltd., and Machine Products, Ltd.

Mr. Hall was previously commercial executive for the Swindon region.

☆

Two students who recently gained B.Sc. degrees at Southampton University were among those who received awards at the annual prize giving for Hoover apprentices at Perivale, Middlesex.

They were **Mr. Michael Seddon** of Ruislip and **Miss Vanda Blois** of North Wembley. Miss Blois, who received the first Hoover university scholarship five years ago, got her B.Sc. last year. She was presented with a prize to mark the completion of her scholarship.

The works manager's shield for the best all-round apprentice of the year went to **Mr. Robert Ford** of Kingsbury, and the craftmanship prize went to **Mr. Arthur Thomas** of Harlesden.

☆

Ketay, Ltd., a member of the Plessey Group, announces the appointment of **Mr. K. J. Coleman** as chief engineer.

Previously, Mr. Coleman was head of Control and Instrumentation of the Atomic Energy department of Babcock and Wilcox. Before this, he was with De Havilland Propellers, Ltd., as senior development engineer and head of the alternator development department.

☆

After seventeen years with British Ropes, Ltd. at Gateshead, **Mr. J. R. Stuart** has been appointed wire mill manager of Cables Mexicanos S.Am., the British Ropes associate in Mexico.

Mr. Stuart started work as a boy in the wire mills at Gateshead when he was fifteen, and for the past eighteen months he has been in charge of the wire mill.

Mr. E. Errington replaces Mr. Stuart as wire mill manager at Gateshead.

Mr. R. Hall

Mr. David Murrell, aged twenty, of Chingford, has been named "Apprentice of the Year" at British Oxygen's Engineering Division, Edmonton. His prize is a month's visit to an engineering company overseas.

Lord Reith made the award at the annual prize presentation and social evening. Lord Reith is vice-chairman of British Oxygen.

Mr. Murrell went to British Oxygen in September 1957 and

☆

Mr. K. J. Coleman

since then he has studied at British Oxygen's training school and at the South West Essex Technical College. He has already passed the intermediate level of the City and Guilds Machine Shop Engineering examination and takes his finals next May.

Mr. R. D. Macmillan, managing director of Controlled Heat and Air, Ltd., a member of the Incandescent group of companies, died recently.

In 1933, he joined Controlled Heat and Air, Ltd., as chief designer and was appointed managing director in 1945.

☆

Mr. R. Shelton, product designer for Stanley Works (G.B.). Ltd., the tool manufacturers, has been appointed to head a new department responsible for the design and development of new products.

Mr. R. Bradley, formerly chief planning engineer, has been appointed manager of the engineering department.

The chief engineer, **Mr. L. Ford**, is leaving the company to take up a new appointment.

Coming EVENTS

THIS WEEK

November 15-29
Building Exhibition. Olympia, London.

November 23
One-day Conference of the British Institute of Management on Efficiency in the Office. Connaught Rooms, London, W.C.1.

November 27-December 1
Fifth Congress and International Automation Exposition. New York.

November 29-30
Conference on Oil Hydraulic Power Transmission and Control. The Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London.

December 11-13
British Iron and Steel Federation Accident Prevention. Old Swan Hotel, Harrogate.

January 3-13, 1962
Eighth National Boat Show. Earls Court, London.

January 8-12, 1962
International Heat Transfer Conference, Institution of Mechanical Engineers. Westminster London.

January 9-11
Eighth National Symposium on Reliability and Quality Control. Washington, D.C.

January 15-19
Symposium of Optical Character Recognition. Washington, D.C.

January 15-19
Physical Society Exhibition of Scientific Instruments and Apparatus. Royal Agricultural Hall, Westminster, London.

January 22-25
National Plant Maintenance and Engineering show. Convention Hall, Philadelphia.

January 24-27
Canada Farm and Industrial Equipment Trade Show. Toronto, Canada.

January 27-February 2
Electrical Engineering Exposition. New York.

February 16-24
International Inventions and Commercial Development Exhibition. Central Hall, Westminster, London.

February 26-28
Joint I.E.E./R.Ae.S. Conference. The importance of electricity in the control of aircraft. London.

March 9-18
Eleventh International Inventors' Exhibition. Brussels.

March 13-15
Conference on Testing for Performance. The Plastics Institute, London.

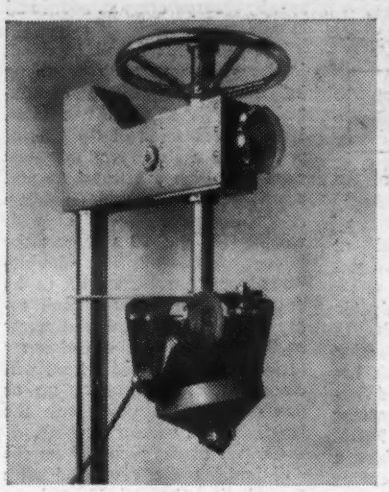
March 15
Symposium on the Computer and Mechanical Engineer. Institute of Mechanical Engineers, London.

March 20-24
Eleventh Electrical Engineers Exhibition. Earls Court, London.

April 10-14
Second International Conference on Stress Analysis. Paris.

April 16-18
Second International Flight test instrumentation Symposium. College of Aeronautics, Cranfield, Bucks.

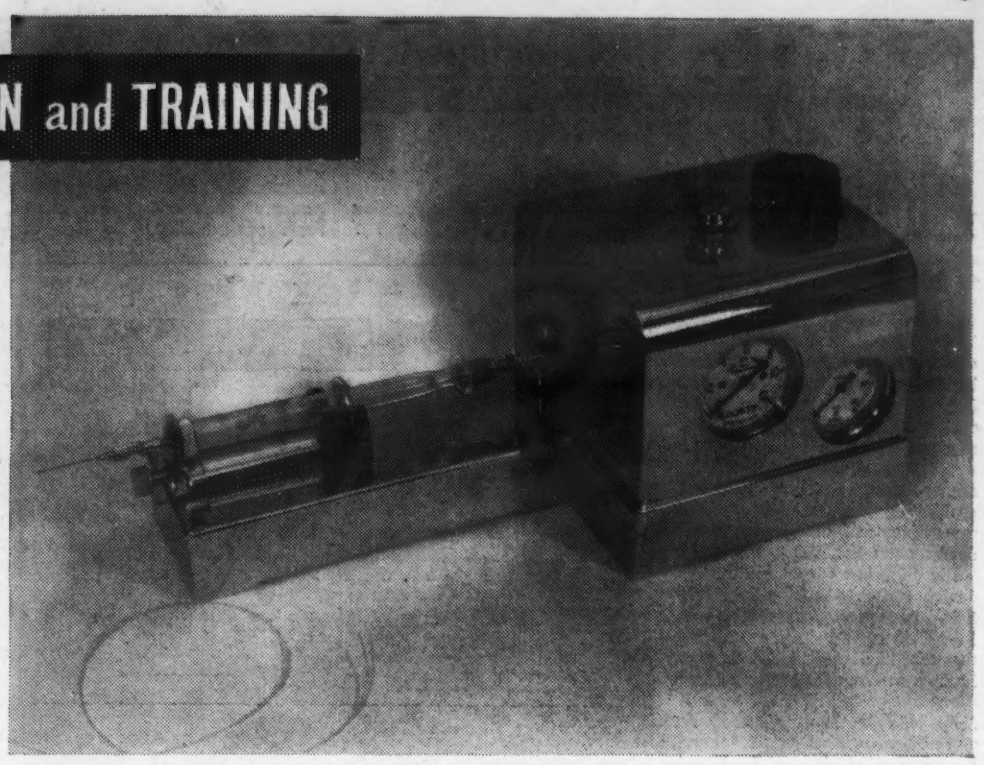
April 21-October 21
World Fair. Seattle, U.S.A.



This universally mounted electro magnet is in use in a local hospital. Made by Dowty Group apprentices, it removes metallic particles from the eye by electro magnetic forces.

EDUCATION and TRAINING

Recognition of the individual is important



This apparatus, designed by Mr. C. Blazdell in conjunction with the hospital authorities, was made by the Apprentice Section at Arle Court. It consists basically of a hydraulic jack capable of slow and closely controlled movement which operates the plunger of a hypodermic syringe and is used for giving gradual injections—usually for anaesthesia—over a long period of time.

MAKING the most of human resources is a vital ingredient to the success of any industry. Increasing awareness of this has led to the progressive development of industrial training schemes. Recognition of the individual and his ability is a characteristic of training schemes operated by the Dowty group of companies at Cheltenham.

by OUR EDUCATION CORRESPONDENT

The range of the group's training scheme and its capacity for the development of the "whole human being" with its sustained interest in development of his industrial skill and personal adjustment attracts recruits from all over England and the Commonwealth.

Centralised

The Dowty group comprises 23 member companies, 17 in the UK, three in Canada, two in the US and one in Australia.

Most of the UK companies are grouped in the Midlands with concentration in the Gloucestershire area, greatly assisting the organisation of educational programmes. Although each company has its own training facilities, three main centres have been developed, with headquarters at Arle Court, Cheltenham.

The other two are at Ashchurch and Staverton. Training for the remaining members is controlled from one of the three centres, depending on which is nearest to the group factory.

The group's scheme is run by the chief training executive, Mr. K. W. Browning, whose headquarters are at Arle Court. He was a commando in the war and has the characteristics necessary to command attention and respect from young people.

A boy is never rejected on a result of the tests alone, as these are considered only in conjunction with other factors, such as the personality of the applicant.

Last interview

After the tests the candidate undergoes a "one to one" interview with a member of the training staff. During this the staff member will have before him the result of the intelligence and aptitude tests and the report from the boy's headmaster.

If the interviewer is satisfied, this is followed by a final interview usually by a director, a senior executive, and an official of the training staff.

After acceptance, the first nine months of the five-year training period is spent in a special school in which is taught machine tool operation and other subjects.

Material resources of the training centres include over 100 machines exclusively used for training purposes. This variety of equipment enables the young trainee to tackle a number of jobs and to remain interested during the vital and formative period of his career in industry.

For example, initially he may make a set of engineering tools and from this progress to more skilled work. One boy sometimes is allowed to follow through the complete scale of operations on a piece of equipment that would normally be undertaken in the machine shop.

This ensures that the boys have sufficient ability and knowledge to operate a selection of machines and follow jobs to their efficient conclusion.

Group training also absorbs university graduates with art degrees. These usually enter the commercial side of the organisation, for example, accountancy, production control or general administration.

A comprehensive estimate of the cost of training a suitable boy for five years is in the region of £2,000, and with costs in this region, efficient selection techniques are vital.

Strict selection

The group's training scheme utilises modern and proven methods of selection. Its success is shown by the small degree of wastage.

Mr. Browning told Engineering News that for each of the 140 places allocated annually, there are over six applications, the majority of which are passed through rigorous and searching selection.

Applicants take an intelligence and aptitude test. In this the "test battery" system developed at the National Institute of Industrial Psychology has been found successful.

Altogether there are 700 trainees in the group. Forty-five of these are young women engaged in commercial and secretarial courses, and 450 of the total are in the Gloucester area.

The annual intake for general apprentice training is about 140, and boys are taken from the Secondary Modern "B" stream level up to the graduate status. Most boys from Secondary Modern schools train as craft apprentices, usually after passing the City and Guild Examination.

Those with "O" level in the General Certificate of Education (G.C.E.) examination tend to study for the Ordinary and Higher National Certificates and are destined to become technicians and draughtsmen.

Managers ?

Those with "A" level G.C.E. take further endorsements, H.N.C., H.N.D. or Diploma of Technology courses, enabling them to become Associate Members of an Institute, so that they can take posts as technologists.

There is a training staff of 27; three are trainee apprentices, employees, and secretarial clerical trainees. The remainder head training sections, libraries, instructors, and clerical staff.

Potential managerial material comes partly from the intake of university engineering graduates, although there is ample opportunity for any recruit who is equipped with character and ability. The deputy chairman of the Group is an ex-apprentice as are other directors, senior executives and managers.

Other facilities for the apprentices include their own drawing office where all of them without exception spend up to three months, or, in the case of commercial apprentices and graduates, up to one month.

Within this period a comprehensive course gives them a thorough grounding in drawing techniques.

Afterwards the apprentice will spend limited periods in the factory and will also visit other factories within the group.

After 2½ years of training, usually at the age of 19-19½, a decision is made on the most efficient use of his talents. The rest of the course will be biased towards his particular engineering choice.

In a group as large as Dowty's, apprentices have a diversity of opportunities and the openings are almost limitless, as indeed are the prospects for those who display the abilities required.

Extra study

For all apprentices, technical college training is compulsory one day and one evening a week and negotiations are under way to introduce the block release system favoured by the Government White Paper earlier in the year.

There are also opportunities to attend sandwich course leading to the Diploma of Technology in mechanical engineering and in the near future there will be a similar course in business studies.

Students from the scheme are also sent to universities, and out of ten firsts awarded in the external examination of London University in mechanical engineering in 1961, three were Dowty students.

Self-report

Before leaving a department each boy himself completes a report of work which he has done. This report is completed by the foreman with his own appraisals. A synopsis is sent at the end of the year to the boy's parents together with the report from the technical college.

The group's training organisation utilises modern instructional techniques and makes full use of all visual aids including films. Throughout the year, apprentices attend lectures on elementary workshop practice, and each student's notes are checked periodically.

The YMCA and the Economic League also arrange discussions during work's time on current affairs and topics of general interest, such as Local Government and Britain's Road System.

There is an active Apprentice Association to whom the Company gives a high degree of autonomy. They arrange dances, sports functions and similar social events, and also camping weekends, night exercises, visits to other companies and establishments.

Women

As already mentioned there are 45 trainees on clerical and secretarial courses. The former have usually had a Secondary Modern or Grammar School education, while the latter have usually obtained O or A level G.C.E. or a degree.

Initially they attend a one-year internal course, spending the morning in lectures on commercial subjects such as shorthand, typing, book-keeping, and secretarial practice, and the afternoons in offices where they get valuable experience of the day-to-day function of the work in which they will finally be employed.

At a later stage they attend technical colleges and take the Royal Society of Arts or the Pitman's examination. At the moment, four of these students are secretaries to directors.

The Dowty organisation is eager to aid ambition and develop initial capacity.

During the last year, 330 employees of managerial status and upwards attended internal or external courses covering over 100 different subjects from the use of radio-isotopes to the implications of the Common Market.

Educational correspondence courses are also used and, in suitable cases, the group gives the student financial assistance.

Supervisory training for foremen and section leaders is done by T.W.I. (Training within Industry) organised by the Ministry of Labour, and internal courses on production planning, cost control and human relations. When justified employees are also sent on external courses.

Wide scope

Another important factor is that of management training, and this is actively encouraged and supported by Sir George Dowty.

For the young recruit to industry, perhaps one of the brightest and most attractive features is the scope for ambition and promotion within the organisation.

There is flourishing evidence that the recruit of merit may well hold "the field marshal's baton in his haversack".

At an early stage, a suitable candidate for promotion receives training through internal and external training courses.

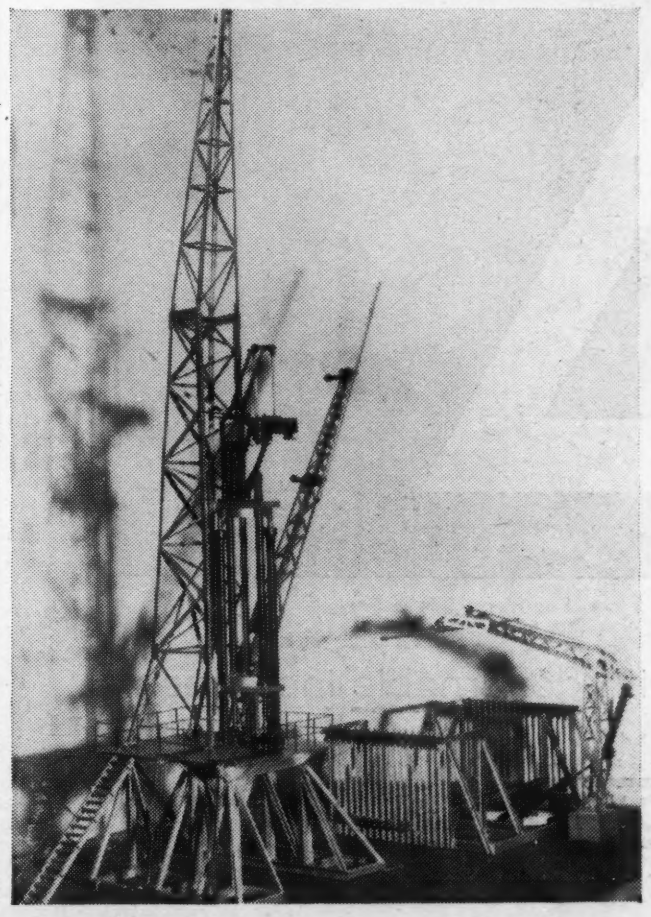
Lectures

Candidates nominated by their heads of departments may attend a one-week internal course, giving an introduction to management practice. About eight students attend each course and lectures are given by senior directors and executives.

During training, two 15-minute talks are given by each of the candidates, usually one on engineering and another on some aspect of management policy. Completion of these courses are often followed by changes at work in position or duties.

For senior management training, use is sometimes made of the Administrative Staff College at Henley. Part of this training includes public speaking courses, which are also available for many other grades of personnel.

The Dowty Group's attitude to education is progressive and aims at the finest training for the job with emotional and psychological adjustments taken into consideration.



Scale working model of an automatic oil rig designed by Dowty Rotol Limited. There are 17 hydraulic jacks fully operational on the model. The sequence at the moment has to be hand-operated but otherwise the model is functional. This was built by the apprentices of the Group.

Details of seminar in Sweden

DETAILS of the 1962-63 course of the International Seminar for Research and Education in Physics is announced by the University of Uppsala, Sweden.

This is sponsored by the International Atomic Energy Agency, United Nations Educational Scientific and Cultural Organisation, and the Central Committee for Swedish Technical Assistance.

The course is for one year and is intended for non-European students and scientists, mainly from developing countries, who are connected with teaching or research in a university or national laboratory. The official language of the seminar will be English.

The aim of the seminar is to provide facilities for individual participation in qualified experimental research work in one of the various fields of physics, under the guidance of scientists.

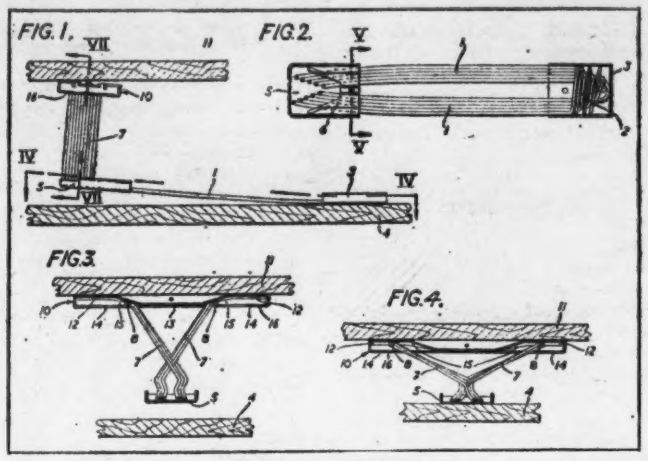
Delegates will also see how Sweden and other European countries have organised their schools, universities, scientific institutions, and industrial laboratories.

DELICATE PARTS ARE SPRING CUSHIONED

DELICATE apparatus is often packaged in an inner crate resiliently supported in an outer crate by coil springs or compressible resilient material such as sponge rubber. Such cushioning devices require a relatively large volume of wasted space to be left between the inner and outer casings. **Patent No. 880,070,** filed by **the Minister of Aviation** and **John Kenneth Bache,** provides a spring cushioning device in which a given load can bring about a small deflection and greater energy absorption than the conventional cushioning devices, and at the same time will occupy a smaller dead space when fully compressed.

Fig. 1 shows the cushioning device (unloaded) in side elevation. A section through the line 1V-1V is shown in Fig. 2, and through the line V11-V11 in Fig. 3. Fig. 4 shows the corresponding cross section when the device is fully loaded. It consists of an assembly of tension rods 1 formed by the parallel sides of U-shaped lengths of heavy gauge wire. The closed ends 2 of the U-shaped lengths are anchored, within a sheet metal housing 3, to the inner face of the outer crate 4.

At the outer end, the torsion rods seat upon a base plate 5 which bears upon the inner face of the outer crate when the device is loaded. Also at this outer end, integral extensions of the torsion bars are bent up at right angles to form lever arms 7. As shown in the cross section these arms 7 are inclined in opposite directions so as to cross over one another alternately. When not under load, the free ends 8 of the lever arms 7 bear against inclined cam surfaces 15 formed on a grooved pressure plate 10, which itself bears against the outer face of the inner crate 11. (Alternative forms of the device are also described in the Patent in which the pressure plate 10 is eliminated,



PATENT No. 880,070

the turned-over ends of the torsion-rod extensions forming a bearing surface.)

Preferably, under no load the torsion rods are given an initial torsional stress (and the Patent covers means for pre-stressing) so that there is a force on the lever arms tending to move their outer ends 8 against the cam surfaces 15. When a load is applied to the pressure plate 10 sufficient to overcome this restoring force, the pressure plate starts to move downward and the ends 8 of the oppositely inclined lever arms are moved further apart. This movement is resisted by increasing torsional stress in the torsion rods 1, but at the same time the effective length of the lever arms is increasing, resulting in an increased twisting moment on the torsion rods for a given load.

These two effects tend to counteract one another, and it can be arranged that very little deflection of the pressure plate 10 occurs until a predetermined load is reached. Thereafter, a small load increase is sufficient to cause relatively large deflections of the pressure plate and correspondingly large energy absorption.

The predetermined load at which the device begins to respond can be arranged to be safely below the maximum permissible force on the packaged goods. In contrast to a foam rubber cushion or simple coil spring which has a substantially linear load deflection characteristic, the spring cushioning device of Patent 880,070 is capable of absorbing a much greater amount of energy before a predetermined load is exceeded.

In use it is intended that several such devices will be used, at least one on every side of the wire crate so that the latter is floatingly supported.

new PATENTS

ALUMINIUM COATINGS FOR STEEL

ULTRA-HIGH-STRENGTH alloy steels (u.t.s. greater than 200,000 lb./sq. in.) are subject to corrosion by oxidation at elevated temperatures or attack by salt spray in the atmosphere. In **Patent No. 881,792,** granted to the **National Research Corporation** of Massachusetts, a method of protection by applying a thick corrosion-resistant coating of aluminium is described, which protects such steels against oxidation at temperatures of 800 deg. F.-1,000 deg. F., and also against salty atmospheric corrosion. This is achieved without any hydrogen embrittlement of the steel and with no observable formation of iron aluminium compound at the interface between base metal and coating.

To apply the coating, the steel surface is first cleaned and degreased and all traces of iron oxide are removed.

It is then heated in a vacuum tank to a temperature between 700 and 800 deg. F.—below the tempering temperature of the steel and sufficiently low to ensure that no diffusion of aluminium into steel takes place. The preheated steel workpiece is then exposed to a source of aluminium vapour at relatively high temperature for several minutes—long enough to ensure a coating of 0.5-5.0 mil. thick, to ensure good corrosion resistance.

The bond between the aluminium coating and the steel base is extremely strong, and failure under bending usually occurs in the coating or in the base metal rather than in the bond.

Although the method can be applied to steels generally, it is particularly suited for coating hot-worked steels because of the problems of hydrogen embrittlement that can arise with electro-plating techniques for surface protection.

POSITION CHANGES IN A SEALED BODY

FOR detecting the position of a member within a sealed body—or the level of liquid within a tank—change of inductance effects have been employed, using a movable differentially-wound double coil to follow the movement of a member of magnetic material. Change of the relative position of magnet and coil unbalances the circuit and the output is used to energise means for restoring the coil to an equilibrium position relative to the magnet. However, it can happen that rapid movement of the magnet can take it completely out of the coil; the electrical circuit is then in balance and no driving output can be obtained to enable the coil to follow the magnet.

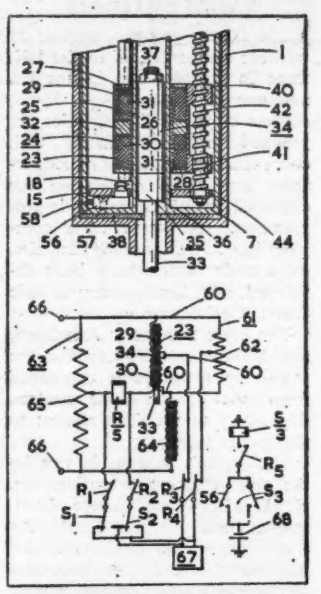
The United Kingdom Atomic Energy Authority have, in **Patent No. 880,387,** provided an electrical position indicating device relying on change of inductance effects which overcomes this disadvantage, by incorporating an additional circuit.

The device described in detail in the patent relates to providing indication of the position of a control rod in a nuclear reactor. Here, an extension of the control rod carries a slug 34 of magnetic material which can travel up and down within a tubular housing. A double wound coil 23 with windings 29 and 30 embraces the tubular housing. The double-wound coil has brazed on to its outer casing, a threaded bush engaging with a vertical lead screw so that rotation of the lead screw (driven by an electric motor) will cause the coil to travel up or down its guide rods along the length of the tubular housing.

Contact blocks mounted on the coil housing are connected with the windings 29 and 30, and are in sliding contact with contact bars extending parallel to the tubular housing. The lead screw drives a magslip position indicator.

Referring to the circuit diagram, the coil 23 is electrically connected by the contact bars and leads 60 in an A.C. energised bridge 61, this bridge being normally balanced when the magnetic slug 34 is fully contained within the coil 23. Bridge 61 comprises the two coil windings 29 and 30 and a potentiometer 62.

The coil 23 also forms one arm



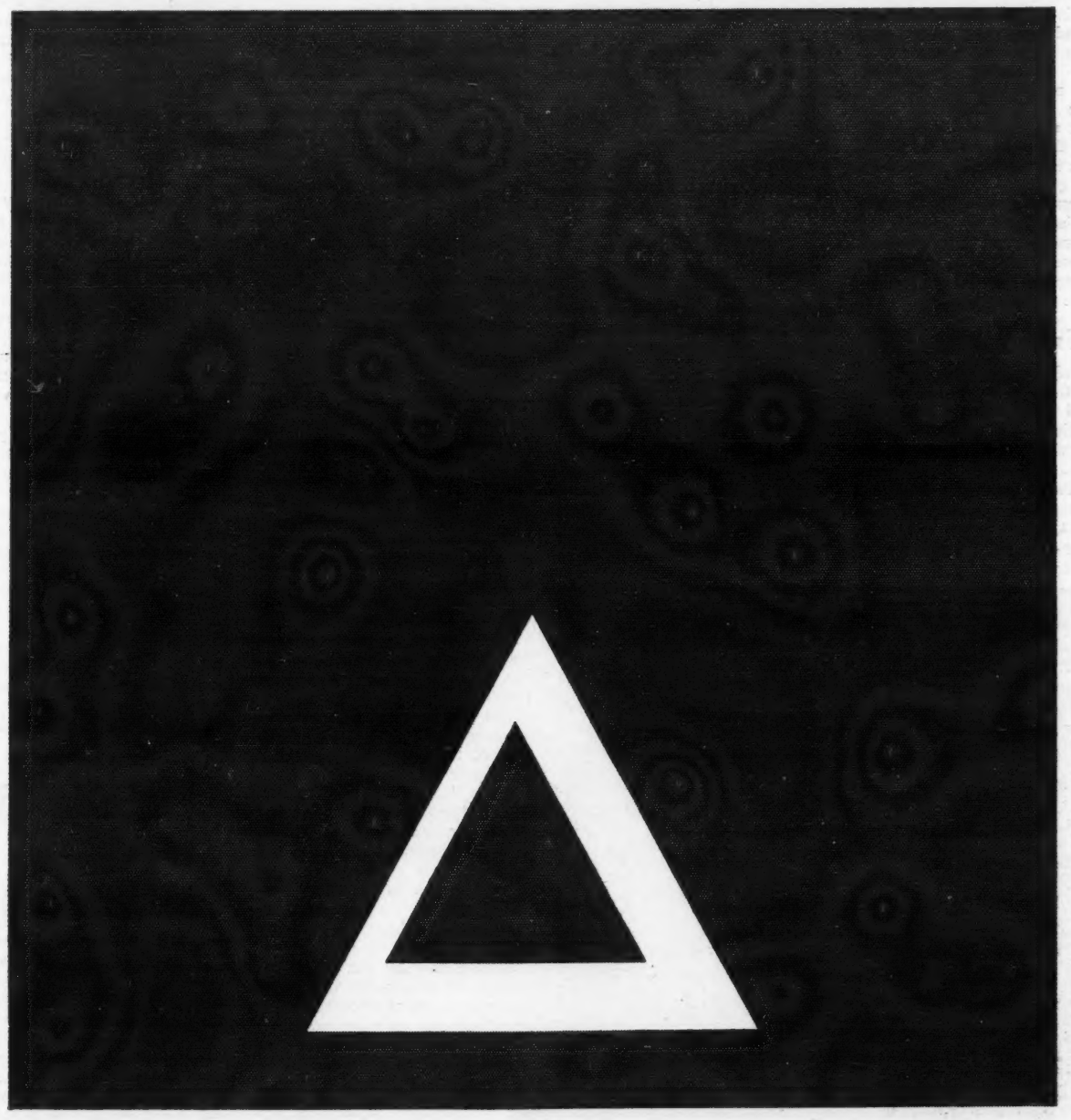
PATENT No. 880,387

of an A.C. bridge 63 including a potentiometer 65 and a coil 64 having an iron core. Input terminals 66 are provided at each end of the potentiometer 65. A relay R having contacts R1, R2, R3, R4, is connected across the output of bridge 63.

Bridge 61 is connected with a phase sensitive servo-amplifier 67 through the normally closed contacts R3 and R4. When energised by out-of-balance in the bridge 61, due to movement of slug 34, the servo-amplifier 67 feeds the electric motor to rotate the lead screw and drive coil 23 either up or down to follow the movement of the slug 34 and rebalance the bridge 61.

When the relay R is operated by a substantial out-of-balance in the bridge 63, the output of bridge 63 is connected with the servo-amplifier 67 through the contacts R, and R2, and through contacts S and S2 of a relay S. This energises the servo-amplifier to drive the motor in a direction determined by the position of contacts S and S2 and a self-holding contact S3 also governed by the relay S. The relay S is energised from a D.C. supply 68 when the contact R5 is closed and the limit switch 56 is operated. The contact S3 holds the relay S operated until contact R5 releases.

If for any reason the magnetic slug 34 moves rapidly downward, completely out of coil 23, the bridge 61 remains balanced, and consequently provides no driving signal. However, complete removal of the slug 34 from coil 23 unbalances bridge 63. Contacts R1, R2 are thereupon closed and R3, R4 are opened.



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A member of the Elliott-Automation group

BEHIND THE SCENES IN BIRMINGHAM

BRITISH INDUSTRY PREPARES FOR THE COMMON MARKET

Midlands form EEC group

ENGINEERING NEWS Industrial Editor, J. D. F. PERRY, begins the first in a series of articles on what British industrialists are doing to prepare for entry into the Common Market.

VENTURE and Prosper — the Birmingham engineer calling at the Chamber of Commerce finds this motto emblazoned on the lift. I met many Birmingham manufacturers who live up to this slogan with vigorous preparations to expand business with Europe.

Plenty of Birmingham's engineering companies already do a substantial part of their business overseas. Those I spoke to see the significance of raising the proportion of their exports in two ways.

The export director of a tools producing subsidiary, speaking as though what he thought was the customary view, said:

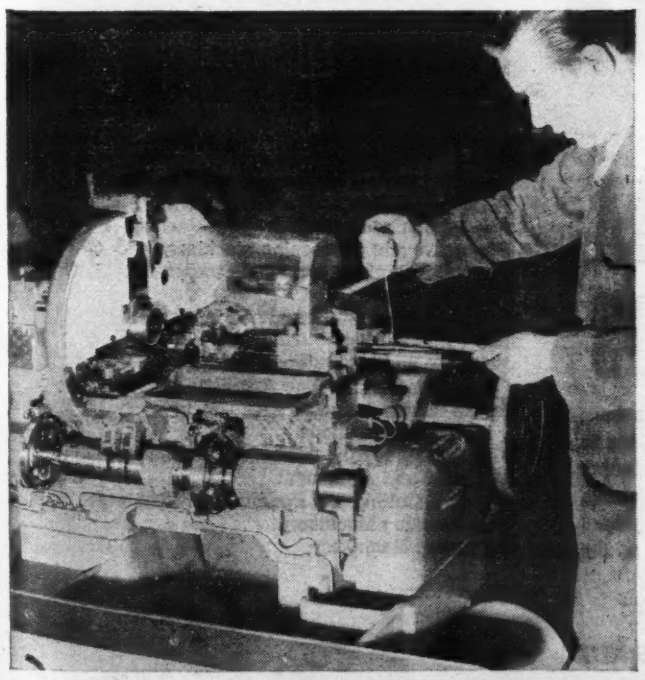
"We find the export market is steadier. The home market fluctuates, the Government does this or that, but overseas our sales go on steadily rising."

The second point is one of production costs. It is a platitude to say that every executive is aware of the need to keep down, where possible to reduce, unit costs.

Success in taking an adequate share in a prosperous Common Market enlarged to include some 300 million people will bring the long production runs in which valuable cuts in cost can be made.

What are the industrialists of the West Midlands doing to seize their chances? The answer is an impressive one.

Just as around the countries of the existing European Economic Community I found intense interest in the formation of



A BSA single spindle machine receives final adjustment.

trading, manufacturing and development agreements, so going about the Birmingham area I found the same interest in associations with European firms or in the establishment of subsidiaries.

At the Chamber of Commerce, Mr. Robert Booth, the secretary, told me that about 650 companies, the majority of them engineering concerns, had joined a specially formed Europe Export Section in order to share experience, gain expert advice and generally to see that venturing into full association with the vigorous economies of the Treaty of Rome spells prosperity for industry in the English Midlands.

EEC welcome

"I should say that about 70 to 80 per cent of our members are in favour of the U.K. going into the European Economic Community," Mr. Booth calculates.

My inquiries showed that it is the big, wealthy companies, with the large turnover on which to carry research and development costs, that most readily express confidence and a "let's get started" attitude.

While the little firms, least able in some cases to weather further narrowing of profit margins, and often dependent on sub-contracted work, may feel the sharp cross-Channel winds first, many are by no means pessimistic.

Those now doing well on highly specialised work of recognised quality for a number of British firms are frequently sending directors to the Common Market countries, as elsewhere in the export markets, to examine the chances of doing the same for firms further afield.

One effect of this is to remove any doubt that if Britain were to stay outside the Common Market the sharp tariff penalties would bring an inevitable falling off in our trade with Europe, and possibly a weakening of our ability to compete in markets outside Europe.

A crisp and decided view of the probable British entry into the Common Market was given me by Mr. P. B. Hugman, export director of BSA Tools.

"We should welcome a move into the Common Market. Our links with the main European countries are already in existence. The removal of tariffs and the association with so larger market could only be of advantage."

World series

Exporting about 27 per cent of their output, the BSA Machine Tool and Small Tool Companies deal with more than 60 countries and have a whole series of marketing arrangements.

Representation is strong in all European countries, but to quote an example, France is covered by five Agents, R. S. Stokvis et Fils of Paris, looking after the multi-tool lathes and hydraulic copy turning lathes, and they manufacture under licence, and sell in the EEC, BSA single spindle automatic chucking lathes.

The ever-present Alfred Herbert concern, in this case, Alfred Herbert Societe Anonyme of Paris and Lyons, looking after the single spindle automatic screw machines, and the BSA acme-gridley multi-spindle automatics. Universal Steel (Gustav Meyer & Cie), Establissements Horstmann, and Forges de Vulcain cover the remainder of the range of machine tools.

At Kitts Green, the Birmingham headquarters of the 10 or more companies of the Tools group, I gathered the BSA men are pretty sure they have the most comprehensive machine tool marketing organisation in the world.

Selling set-up

Through Burton, Griffiths & Co., U.K. selling organisation of the group, sole concessions for Britain are held with the West German firms of Beche & Grohs of Huckeswagen, Robert Berninghaus & Sohne of Velbert, G. Boley of Esslingen, Climax Werke of Aachen, F. Deckel of Munich, Inflagrator and Schiess, both of Dusseldorf, Schulz & Uaumann of Essen, Pee-Wee of Western Berlin, and the recently acquired connection with OKU of Stuttgart, manufacturers of automatic assembly equipment.

One of the company's oldest continental connections is that with the Maag Gear Wheel Co. of Zurich, gear-cutting and gear-grinding machine manufacturers.

Given the international nature of the machine tool industry, and such close association with the best of the European countries, the question was inevitable—"What difference will joining the Market make?"

Difference?

The answer is,- that with the predictable expansion of the West European economy, association with the whole area as one effective home market may be expected to lead to greater machine tool sales — in both directions.

Greater specialisation is more or less taken for granted. To remain on the outside with appreciable tariff barriers in between, could equally be expected to damage the good work so far put in.

When I drew up at Gate Q at Longbridge, the British Motor Corporation's "car town", to ask the way, a delivery van behind me tooted hastily and a lorry behind him joined in. Once inside, where a large party of pensioners

were being entertained, the pace was just as swift.

"We see Europe as a continent of opportunity," one executive explained. "We have always been for freedom of trade and expansion of our exports."

Big potential

Mr. George Harriman, the BMC chairman, came swiftly to the point: "Europe is the biggest potential market in the world. Competing with our Continental competitors in free trade conditions would not be easy but we believe we can give as good as we may get. All things being equal it would be madness to stay outside."

But Mr. Harriman is acutely aware of two important figures. They are the 49 per cent of British motor exports that go to the Commonwealth countries, and the 19 or 20 per cent that go over the Channel to Europe.

The background to this is that British exports to the Commonwealth have for years been a diminishing part of the whole, that important parts of the Commonwealth have fast growing car industries of their own; and that the present Common Market members may have an estimated new car demand of 3.5 million by 1970—40 per cent up from present levels.

BMC's own exports to Europe look like being 50 per cent better this year than 1960.

So much of the prosperity of the engineering industry is geared to that of the car manufacturers that it is worth going into detail over what BMC believes its prospects may be.

Mr. J. F. Bramley, director of exports at BMC, has done one useful sum in which he assumes that entry into the Market would, by loss of preferences and quota reductions, lower car exports from the UK to the Commonwealth by 15 per cent, and that 15 per cent of the home market would be lost to Continental car firms.

These together would amount to a loss of £92.5 million in exports.

Roundabout

The roundabout to this particular swing is the greater British sale of cars in an enlarged Common Market. At 5 per cent each in Germany, France, and Italy, and 25 per cent more in Benelux, which does not have the great car firms of its fellow members, this adds up to a gain of £97 million in exports.

This comes out at a net gain of £4.5 million. But it is possible to show this calculation, which is based partly on past performances, as more than a little conservative.

European car demand can reasonably be expected to move towards the U.S. level faster than anywhere else in the world.

With or without a Channel bridge, Longbridge, Coventry, and Dagenham are a great deal nearer to Paris and Milan than to New Delhi and Melbourne.

And BMC in no way overlook that expanding output is the way to hold down costs and that the firm with the big (Common Market) home sales area is going to have a strong price advantage whether in Asia, Africa or North America.

Design, mechanical performance, and finish, not necessarily in that order, will all affect the success of individual European models in a tariff free future. BMC, making a big impression with their Minis have learned the painful lesson of the paramount need for sales and service organisation equal to that of the home manufacturers.

Accordingly they have made, and are making, a large scale drive in Western Europe — with many more factory-trained staff on the spot, with senior executives in the field, and with Mr. Louis Beare, former director and general manager of the Nuffield Export Co., appointed Director of European Sales and Service, functioning from Geneva.

It is peculiarly appropriate that Wilmot Breeden should have their export offices right in the centre of Birmingham. Manufacturing components for "virtually every car on British roads" and on many other roads as well, the company—as one of its men put it to me—prospers according to the success of the car manufacturers.

The company has carried through some useful diversification such as producing stainless steel pipe fittings for the chemical and petroleum products industries, and owning two successful electronic companies (Wayne Kerr and Ferrograph).

One of the Wilmot Breedon subsidiaries in France, Compagnie Industrielle de Mecanismes SA, has been granted a French State loan and a non-repayable State subsidy, together worth £1.2 million and the pace of development is described by Mr. D. L. Breeden, the company's chairman and joint managing director, as "remarkable".

Wilmot Breeden's initiative in manufacturing car seats and car mechanisms in France for the Common Market manufacturers holds an important lesson for other Midland engineering enterprises.

Links forming

The Midland industries, already doing a substantial part of their trade with Europe and even more with the Commonwealth, are to some extent ahead of the Government in forming links with Europe.

There is no doubt big gaps exist. As between the export office manager who casually spoke of the girls in his office carrying on correspondence in French and German and of his Russian speaking male assistant, and the chief of a smaller firm who told me:

"We write to them in English, like anybody else. If they mean business they'll cope. Anyway we usually send someone over once for a year: it seems to be what's expected."

A specially equipped vehicle records the displacement of the doors and associated equipment on the Peugeot 404 on the pave track at Motor Industries Research Association.

Engineering Industries meet the challenge of changing world conditions . . .

LONDON INTERNATIONAL ENGINEERING EXHIBITION

1963 simultaneously at EARLS COURT & OLYMPIA April 23rd to May 2nd 1963

Never before have Earls Court and Olympia been used together for an international engineering exhibition of such magnitude.

The London International Engineering Exhibition, succeeding and incorporating the long established Engineering, Marine, Welding and Nuclear Energy Exhibition, organised by F. W. Bridges & Sons Ltd., will be Britain's largest international exhibition.

It will be organised jointly by F. W. Bridges & Sons Ltd. and Industrial & Trade Fairs Ltd., who were responsible for the big British Trade Fair in Moscow this year.

The London International Engineering Exhibition has been planned against the background of Britain's negotiations to enter the Common Market with the object of establishing London as an international market place for world engineering, where British manufacturers can compete on their home ground for the business, not only of buyers from Europe and the Commonwealth, but from the entire world.

EVERY FACET OF WORLD ENGINEERING WILL BE REPRESENTED

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Heating, Ventilating and Air Conditioning Plant
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SPRAY PROCESS REFINES CERAMICS

Manufacturing technique for insulators

by

A. E. WILLIAMS

Ph.D., F.C.S.

IN America spray drying has become a standard technique in the production of ceramic and refractory components for use in the electronics and nuclear fields. The great interest that U.S. manufacturers take in spray drying practice is evident from the results of an extensive survey made on behalf of America's oldest and largest firm of spray dryer manufacturers, Bowen Engineering Inc., of North Branch, New Jersey. The survey shows that approximately 80 per cent of American manufacturers considered spray drying as a solution to any drying problem that might arise in their organisations.

AS a result of co-operation between various American university authorities and Bowen Engineering, it is now possible for students of science and engineering to gain actual experience of a spray dryer before they leave university. The University of Maine was one of the first to install a spray dryer in its laboratories. These units are used not only for instructional purposes, they enable the universities to carry out research on behalf of outside firms; thus the students become acquainted with industrial applications before they leave the academic world.

Insulator needs

From the time when electricity was first generated and used, ceramic insulation has played an important part. For a long time the main requirements of a ceramic insulator made from alumina and silica were that it should be mechanically strong and non-absorbent, so that water could not enter to lower the dielectric strength.

Such fundamentals were, and are, adequate to meet many electrical needs. With the development of the electronic and nuclear fields, however, an improved form of ceramic insulation is called for. In these applications the ceramic insulators must be capable of maintaining a high dielectric strength when handling high frequency currents, and often exposed to high temperatures. Further, these ceramic components have to be produced in large quantities and to close tolerances. It is obvious, therefore, that the physical structure of the ceramic powder that goes to make the component is of prime importance.

Particle size

In producing pressed insulators of only small or moderate cross-section, the highest strength is obtained when the powder consists of tiny spheres of practically uniform size. The spray dryer is the unit that can produce this material on a large industrial scale.

The effects of humidity on surfaces of insulators are nullified when the composition of the insulation is non-absorbent and there are no minute crevices on the surface in which small pockets of moist air can accumulate. Here, again, the use of very small spherical particles — obtained by spray drying — in the insulator composition gives that high density of surface which precludes the presence of surface irregularities and the accompanying moisture pockets.

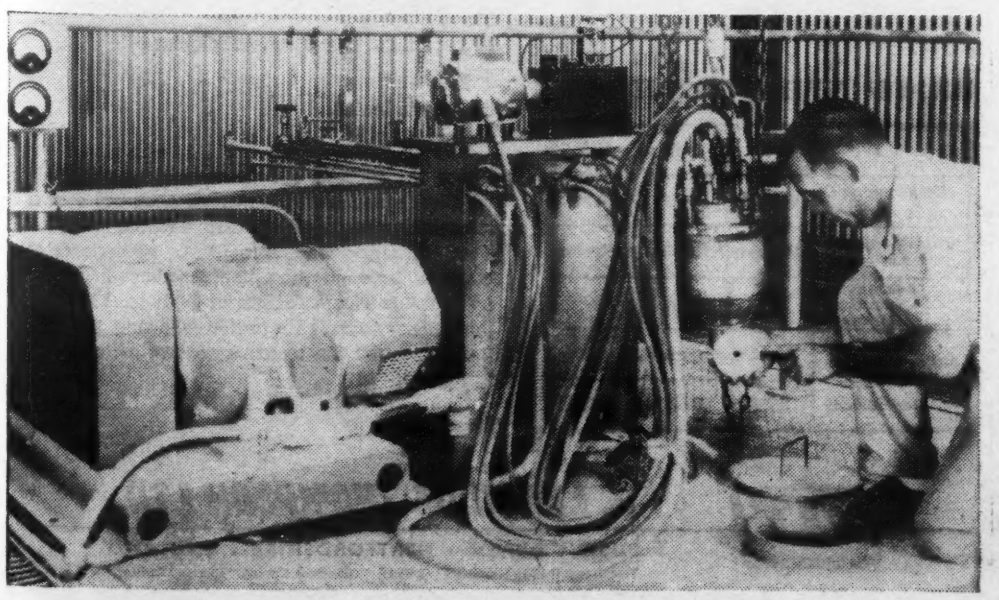
The Frenchtown Porcelain Company, of Frenchtown, New Jersey, a wholly-owned subsidiary of General Battery & Ceramic Corporation, of Reading, Pennsylvania, have for many years been manufacturers of conventional porcelain insulation. In 1956, to enable the firm to meet the demands for electronic and nuclear insulation, a Bowen pilot plant spray dryer was installed, but by early 1961 it was obvious that this small unit could not meet the growing market for these products.

Large dryer

During the summer of 1961 Frenchtown decided to install a completely new spray drying department, which would be capable of producing the ceramic requirements for the entire company's operations. To meet these requirements, Bowen Engineering designed and installed a 42 ft. high spray dryer, having a 16 ft. diameter drying chamber and a conical base. This unit was so big that it was decided to erect it in the open, then construct a building around it afterwards.

At the new Frenchtown plant the raw materials for ceramic insulation — alumina, silica, etc. — are milled and screened and made into a slurry for feeding to the spray dryer. Slurry passes into the drying chamber at the rate of 30 lb./minute.

On top of the spray dryer in the Frenchtown, New Jersey, plant of the Frenchtown Porcelain Co. The engineer is examining the atomising disc of the spray machine seen in the background.



In spray drying it is necessary to convert the slurry into a fine mist, so that when it meets the hot air in the drying chamber water is extracted almost instantaneously. The mist can be created in one of two ways, by forcing the slurry through a nozzle, or passing it over a rapidly rotating disc.

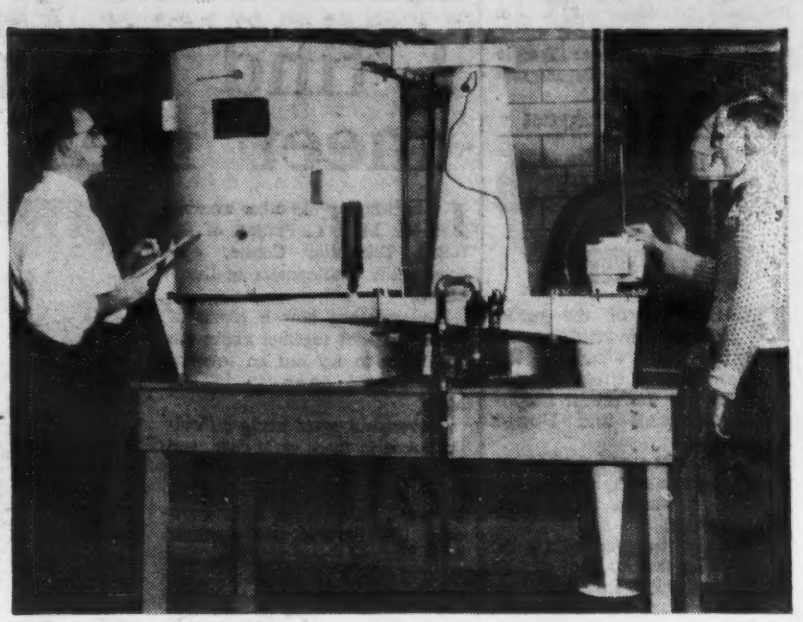
Frenchtown use a disc which spins at 18,000 r.p.m. Slurry concentration entering the drying chamber is 72 per cent, but a moment later the powder leaving the base of the dryer contains a maximum of 0.2 per cent moisture. This powder forms the raw materials for extrusion, casting, or pressing operations to produce the finished components. They are fired at a temperature of about 3,000°F, and where great precision is required in the application they may be ground to exact size.

Precision parts

At the plant of Diamonite Products Manufacturing Company, of Shreve, Ohio, a division of the U.S. Ceramic Tile Company, the production of new types of ceramic insulation is becoming a major part of the firm's activities. They now produce a wide variety of close tolerance—some as close as one mil — electronic and nuclear parts, ranging from precision miniatures only 1/16 in. in diameter, to 6 in. pieces and larger.

When Diamonite entered this field the management recognised a need to look carefully at production methods; what was satisfactory for making conventional ceramic insulation was not good enough in the new field.

Their standard process began with milling the incoming powders, followed by filter-pressing, drying, blending, air-separation, pulverising, screening, and granulation of the product ready for pressing. These lengthy processes give rise to contamination, segregation and charring of the product; also, the compaction ratio of the necessarily different shapes of particles is high, while inefficient drying leaves internal moisture to lower the dielectric strength of the component.



Students taking notes on the performance of a Bowen installation at the University of Maine.

Since most of these processes can be cut out by adopting spray drying, throughout the first half of 1959 Diamonite worked in close co-operation with the staff at the Bowen laboratories and works. Here actual production-size tests were run on the materials being used by Diamonite. After completion of the tests, Bowen agreed to install an all-stainless steel spray dryer on the Diamonite company's works and the unit came into use in September, 1959. It is a 10 ft. high dryer, with a 4.5 ft. drying chamber. Besides producing the right quality product, the dryer has eliminated filter-pressing, blending, air-separation and pulverising processes.

The slurry fed to the dryer at the Diamonite plant is of 60 per cent concentration, and the dryer produces from this a powder of under 0.5 per cent moisture content. The spherical particles are then ready for treatment in hydraulic presses which produce a number of ceramic insulators at each cycle. Fast production of the components in the presses is made possible by reason of the good flowability of the homogeneous, uniform-size, spherical particles. This produces good compaction, high density, and the required high dielectric strength; properties that are maintained after firing the pressed components.

Product quality

In the manufacture of the basic ingredient of resistor capacitor networks and yoke capacitors for the electronics, radio and television industries, Onondaga Pottery Company, of Syracuse, New York State, have found that by spray drying they are able to cut barium titanate processing time and labour requirements by two-thirds, space requirements by a substantial margin, and obtain a better quality product at the same time.

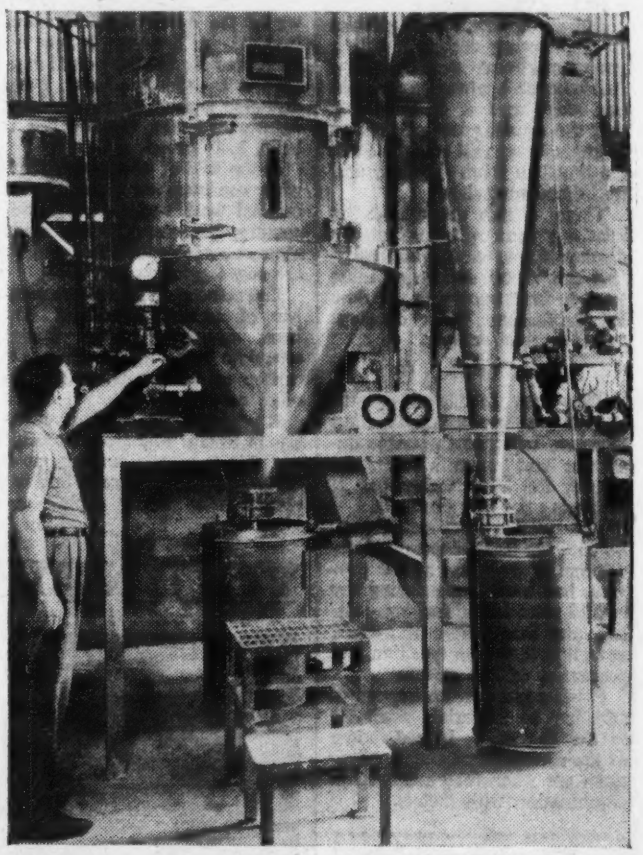
This company — which also makes the well-known Syracuse china — installed a Bowen spray dryer in 1957 to handle the new types of ceramic insulation. Before the dryer was installed the mixing, oven-drying, grinding and screening processes necessary to obtain the fines for pressing, cost the company a total of three days and needed the use of two men simply to produce the powders.

The resultant product, particles of jagged shape, diversity of grain sizes, and the consequent flow deficiency in the presses, gave an unsatisfactory material for the components to be made from it. At the present time, in the production of comparable quantities, the spray dryer produces the spherical fines within one day, thus cutting processing time by two-thirds; simultaneously a free-flowing powder is obtained that will press uniformly.

Nozzle atomiser

The spray dryer at the Onondaga plant uses an atomising nozzle instead of a rotating disc. The slurry is forced through the nozzle by an air pressure up to 20 lb./sq. in. into the drying chamber; actual pressure at the nozzle being about 60 lb/sq. in. A 10 h.p. exhaust fan at the end of the cycle pulls the dried powder into the collection area, the primary collector being located directly under the dryer while secondary collection is effected by a cyclone collector.

The foregoing examples of how long-established American firms in the ceramics industry have turned to spray drying as a solution to the problem of producing the superior types of ceramic insulation needed in the electronics and nuclear fields are typical of many others in recent years.



A spray dryer at the Shreve, Ohio, works of the Diamonite Products Manufacturing Co. Fines are collected in the conical cyclone on the right.

NEXT WEEK

FOR decades scientists have sought to perfect a process for converting the latent chemical energy of fuels directly into electricity. Next week, Engineering News covers the basic principle of a fuel cell in an article by C. J. Womack and outlines the two main types that have been studied.

Coventry looks to the E.C.C.

Continuing its series of articles on how Britain is preparing for the Common Market, Engineering News reports next week on Coventry.

Industrial Editor, J. D. F. Perry, is visiting the engineering centres of Britain and finding out what engineering industrialists are thinking and doing about the Common Market.

Important service for readers

Thousands of readers are making use of the Engineering News Reader Inquiry Service. Once again, in next week's issue, there will be comprehensive accounts of new products, with the opportunity to write to the Inquiry Service for further details.

ENGINEERING NEWS

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Thursday, November 23, 1961

Keep up with the times

DIE-HARDS of the metal producing industries were somewhat taken aback at the large amount of space devoted to plastics at the recent Engineering Materials and Design Exhibition.

One of them was heard to remark that as an engineering exhibition it was a very good plastics show.

Certainly the prominence of plastics was obvious, and so was the interest taken in plastics by the many engineers who went to the exhibition.

* * *

Glass-reinforced polyesters and epoxies are now established for many engineering applications, but development in the reinforcement of nylon and polypropylene is enabling these materials to compete with die-cast metals.

Add to this the wide range of other materials such as silicones, dough mouldings, and epoxy coatings and the picture does seem a little biased.

But the application of plastics to engineering design is still a young and immature technology. Adolescence is always a glamorous stage and it is inevitable that the growing use of plastics in engineering will tend to draw the limelight from the older and traditional materials.

There is little doubt that the relatively young plastics industry displays its wares to good effect and the metal industries must learn to keep pace with the time by publicising their developments more effectively.

* * *

They must do this not only to keep themselves in a flourishing business, but also to enable designers and manufacturers to employ the latest techniques in producing the best products.

The trouble does not always lie with the lack of technical development because much progress has been made during the last 20 years in the forging, casting, and fabrication of metals, as well as in the composition and properties of the metals.

Plastics are now an important addition to materials available to the designer. Indeed, some of their most interesting applications are when they are used in combination with metals.

Tomorrow's technology

EFFORTS to reduce time and costs in drawing offices will undoubtedly be intensified as part of the general drive for improved productivity.

A method of doing this, suggested by an American firm (TAB Engineers Inc.), is to use large wall-size blackboards instead of drawing boards.

The entire project can then be seen without the need for inspecting drawings one at a time.

Detailed working drawings can be made by overlaying a ruled plastic sheet, adding dimensions and photographing.

It is claimed that not only can design changes be easily introduced, but drawing costs can be cut by 50 per cent.

—SCANNER.

An Engineer's DIARY

I find it refreshing to meet men of courage

I was listening the other evening to Mr. M. J. L. Pulling, of the B.B.C Television Centre, describing the development of Eurovision.

He explained how a group of enthusiasts got together about ten years ago to try out an international network, on an experimental basis.

Although a great many difficulties arose in these early days, and the quality of the picture left much to be desired, most of the problems have since been overcome. The network now stretches from Finland down to Spain, and from Scotland to Sicily.

No doubt, if it had been worked out on paper in 1952 it could have been proved that an international network was not a practical proposition.

I find it refreshing to meet electronic engineers who have the courage to put their ideas to the test in a practical way, and I am sure that the older engineering industries could learn a useful lesson from this.

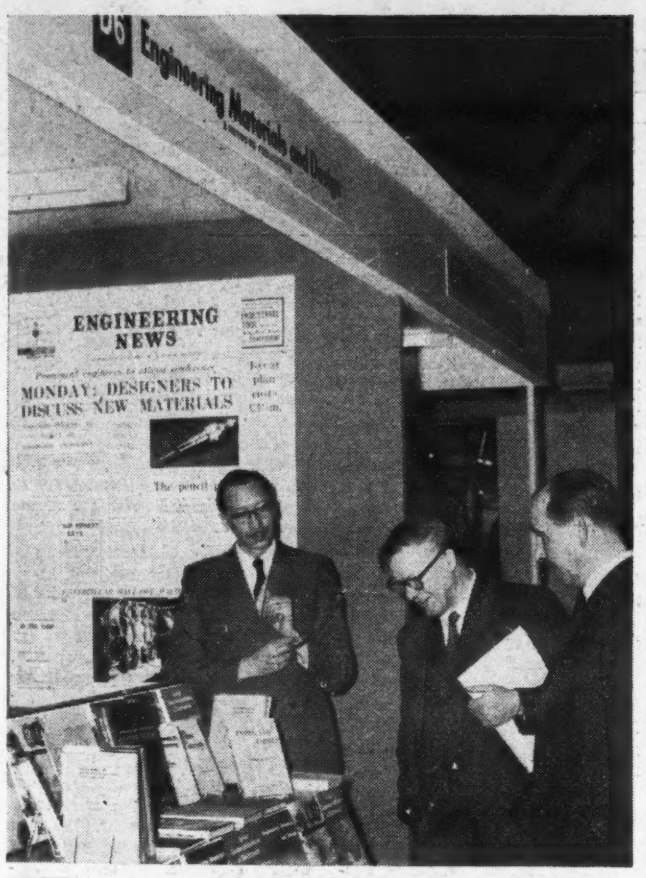
Open sandwich

SPEAKING to Bryan Noton, technical assistant to the Director of the Aeronautical Research Institute in Sweden, before his address to the Engineering Materials and Design Conference, I was disturbed to hear that yet another British pioneering development is being lost abroad.

In the field of honeycomb sandwich construction, much of the original work was started in this country, but the US has made some remarkable advances, and we are now lagging in this work.

I sometimes despair of the number of occasions brilliant new ideas emanating from British scientists and technologists are carried to commercial success by other countries.

It is usually the business interests in Britain who are responsible and this is a little puzzling, as it is usually the business interests abroad who finally exploit the ideas.



THE camera catches Sir William Penney (centre), deputy chairman of the United Kingdom Atomic Energy Authority, as he tours the Engineering Materials and Design Exhibition.

During his tour he came across EMDEE, threw it a puzzled glance, and strolled on.

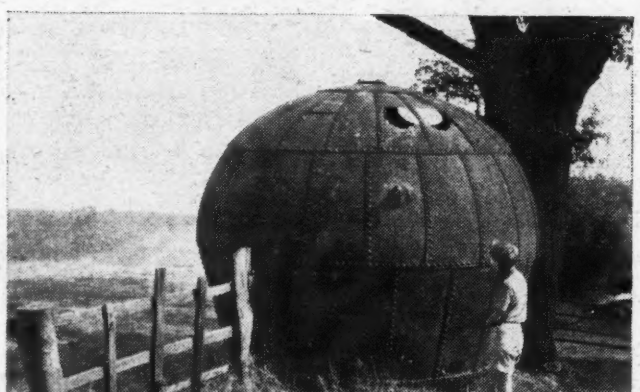
Many other visitors had a close look at EMDEE, a large crystalline lump which they were invited to identify.

They said it was quartz. They said it was mica. They said it was all sorts of things. But only six people guessed the answer.

For those of you who are still wondering, it was a phenol formaldehyde resin.

John Heywood

YOU NEVER KNOW!



FLYING SAUCERS—Mars—space: they were my jumbled impressions when I first glanced at this photograph, but it's only an old rusting boiler, about 170 years old.

A man, investigating disused tram-tracks near Denby Hall Colliery, Derbyshire, stumbled across it and reported it to the assistant curator of the London Science Museum.

The museum says it is one of the earliest forms of boiler. It is made of wrought iron and was known as a haystack boiler. Apparently it was manufactured in the 1790s and installed in Denby Hall Colliery, where it was used until 1885—almost a century.

Then it was discarded and left to rust away in a field, and children have used it as a plaything for generations. Now it is in the Science Museum. Eventually it will be connected to an old beam pumping engine from another colliery to provide a mock-up of eighteenth-century engineering.

SOVIET ENGINEERING

by our own correspondent

900 attend conference on non-destructive testing

THE current number of Avtomaticheskaya Svarka — the journal of the Paton Electro-welding Institute, Kiev — contains a detailed report of the Second All-Union Conference on the Non-Destructive Testing of Materials.

The conference, in Leningrad, was attended by more than 900 delegates from 147 towns of the U.S.S.R.

Of the 95 papers, many dealt with applications recently developed in Soviet research laboratories.

A group working in the Bauman Institute, Moscow, has built an electronic-optic transducer which enables the X-ray checking to be mechanised and the weld seam to be observed on a television screen during the illuminated period.

It is claimed that the method—which allows the "productivity" of checking to be raised 10-20 fold in comparison with photo-methods—may be effectively applied in checking welded tubes.

* * *

The Leningrad Electro-Technical Institute reported on the first industrial automated unit for high-speed monitoring of rolled sheet. The sheet, up to three metres in width, is immersed in water and moved on rollers between systems of transmitting and receiving vibrators at a speed of 10 metres/minute.

The representation of the defects is recorded on electro-thermic paper to any desired scale. The report states that the checking speed when the television method for recording the defects is used can be raised to several square metres per minute.

A delegate from the Central Scientific Research Institute for Technology and Machinery described an ultrasonic method for continuous automated checking of the thickness of sheets and the walls of tubes (3 mm and more) at a speed of 3-5 metres sec.

The next conference of non-destructive methods will be held at Kiev in 1963.

* * *

Diffusion vacuum welding of metals was the subject of a conference recently convened in Moscow by the Scientific Research Laboratory for Vacuum Diffusion Welding.

One infers from the introductory address by Prof. Kazkov, head of the laboratory, that the subject is still in its initial stages.

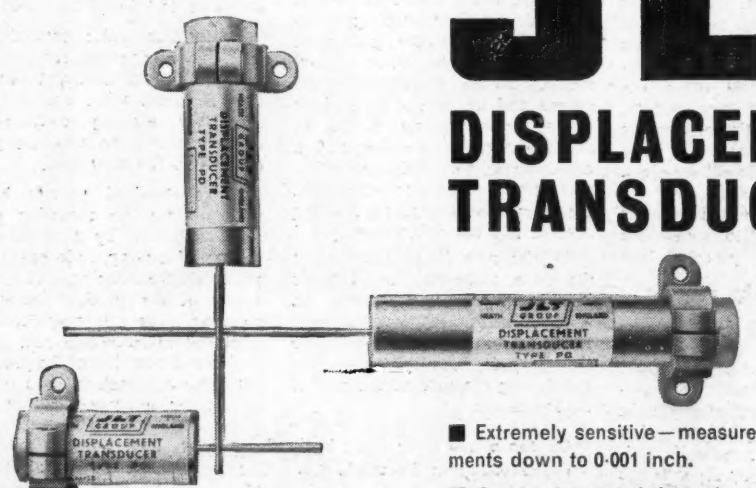
His paper, The Present Positions and Future Prospects of Vacuum Diffusion Welding, emphasised the importance of welding rare metals such as Titanium, Tantalum, Tungsten and Niobium, and also metal-ceramics and pure ceramic materials.

In a paper on the welding of bimetallic parts in a vacuum for brake blocks and high-speed friction discs, U. N. Moiseyev and B. T. Krysin pointed out that vacuum diffusion welding prepares the ground for mechanical and automatic production of bimetallic sectors, and raises the quality of the parts.

They quote figures showing that for one factory alone this leads to an economy of 800,000-1,000,000 roubles per annum; they do not state if this figure is at the old rate of 28 roubles to the £ or on the new rate of 2.8 roubles.

JLT

DISPLACEMENT TRANSDUCERS



- Extremely sensitive—measures axial displacements down to 0·001 inch.
- Can be orientated through 360° axially.
- Less than 1 gm force will displace shaft.
- Easy to install.

BRIEF SPECIFICATION

	PD1	PD2	PD3
Displacement Range:	0—0·5″	0—1″	0—2″
Potentiometer Resistance:	3,500 ohm	7,500 ohm	15,000 ohm
Maximum Operating Voltage	20V	40V	80V
Maximum Slider Current:	5 mA for all models		
Resolution:	0·2%	0·1%	0·05%

These transducers will measure static or slowly varying displacements with high accuracy over a temperature range of—40°C to +100°C.
The ceramic-based precision potentiometer element* is wound with a platinum alloy wire giving an absolute discrimination of 0·001 in. They are particularly suitable for profile following, position indication and the measurement of material deformation.

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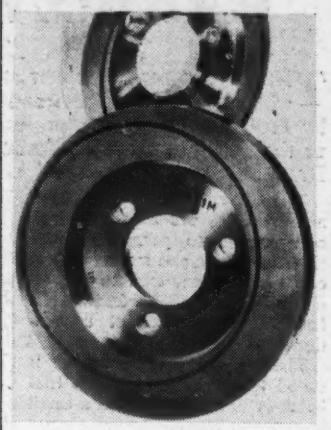
TOOLS SHARPENED BY ELECTROLYSIS

ELECTROLYTIC sharpening of carbide cutting tools to a high degree of finish is now being demonstrated in London. Maschinenfabrik Uerkheim AG, of Switzerland call their machine the Contelyt. It is on show at SOAG Ltd., Hester Road, Battersea, until tomorrow.

This electrolytic "grinding" machine has its own purpose-built generator housed in the base, and one switch controls the machine.



In the Contelyt machining process the contact wheel is the cathode. Electrolite must be constantly renewed and the salts and oxides removed.

High degree of finish on carbide tips

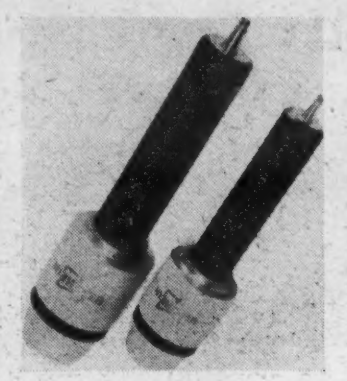
The contact wheel is converted into an electrode over which is directed a flow of electrolyte as the tool is being machined.

The tool forms the other electrode when placed against the table to complete the electrical circuit. No heat is generated in the workpiece and the surface finish is approximately 10 micro-inch r.m.s.

Metal removal rate

The rate of metal removal achieved with the Contelyt process per sq. cm. of contact area is between 100 to 150 cu. mm. per minute. In other words, from a workpiece with an area of ¾in. x ¼in., approximately .040in. of material will be removed in one minute, with a current density of 100 amps or less.

In the workshop, the machine replaces the conventional silicon carbide or diamond wheel carbide tool grinding machine. The saving on diamond grinding material alone is 80 to 90 per cent, whilst the metal removal rate increases eight-fold for the same machining time.



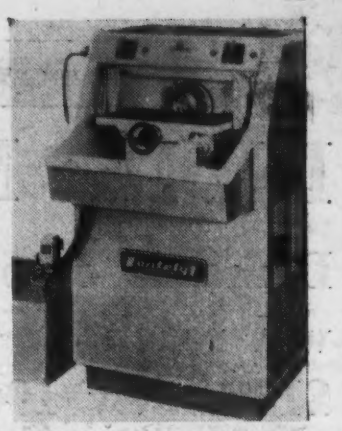
Contelyt Iso-Insulated Spindle. Using this equipment, machines of new or existing design can be adapted for electrolytic machining.

The normal method of sharpening a carbide tool is to first rough grind, secondly finish grind, and then finish by lapping.

In this new machine all these operations are finished in one pass. In practice it has been found that the operator quickly gets used to the new method, since the procedure is almost the same as for conventional grinding.

The firm is also marketing a portable grinding spindle by which machines of new or existing designs can be adapted to Contelyt machining.

Suitable machines are almost all types of grinders, as well as special multi-station machines such as used in transfer-lines.



The Contelyt electrolytic production machine for machining carbide components. It has a built-in generator. Alongside is the container for special electrolyte.

FIRST NATIONAL MAINTENANCE CONFERENCE

A smooth output is essential

INTEREST shown in the first National Maintenance Conference and Exhibition at Central Hall, Westminster, last week was considered by the organisers to be highly satisfactory.

Among the exhibits displayed were equipment for preventative maintenance control, special tools, welding alloys, gear for clearing blockages in piping, machining lubricants, and versatile constructional equipment which can be erected to carry out repairs on site.

At the conference many facets of maintenance engineering were covered by papers dealing with safety precautions, the importance of the maintenance executive, maintenance efficiency and cost control, incentives for personnel, and design related to maintenance.

Awareness

With the steady growth of automated processes the importance of the maintenance engineer increases. Mr. J. O. Hughes dealt with this aspect in his paper on the Place of the Maintenance Executive in the Management Team.

He considers that to operate effectively the executive must be aware of production targets and new processes needed for future products.

He must ensure that breakdowns can be dealt with promptly. Maintenance costs should not necessarily be the lowest possible, but kept to a level which will provide maximum machine efficiency.

In short, the maintenance engineer must see that a factory runs smoothly and with minimum interruption to production.

ICI £1.5m. PLAN APPROVED

APPROVAL has been made for Imperial Chemical Industries to go ahead with a scheme costing £1.5 million for extending the factory of their general chemicals division at Runcorn (Cheshire) and supplying new and modern engineering plant.

Research and technical laboratories form an important part of the extension plan, which will take two years to complete.

The new plant has been specially designed to keep pace with present-day requirements in production and research generally.

Some of the company's workers will be switched to the extended accommodation from nearby Widnes, but it is not expected that any new jobs will be created when the Runcorn plant goes into operation.

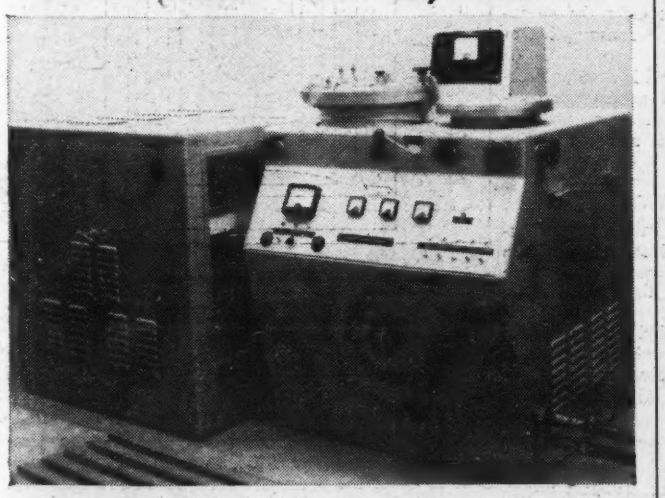
GPO: NO AUTO-SORTING

THE director of postal services, Brigadier K. S. Holmes, was questioned on the prospects of an automatic letter sorting machine at a meeting last week of the Institute of Office Management in London.

He said the biggest snags lay in interpreting the different sorts of type and handwriting.

Magnetic ink (interfered with by paper clips and pins inside envelopes), phosphorescent spots and coded addresses were all being experimented with. The ideal code should contain only six characters.

VACUUM FURNACE WORKS AT 2,400°C



CHOICE of manual or semi-automatic controls are provided on a high vacuum sintering or heat treatment furnace developed by Vacuum Metallurgical Developments of Manchester.

Maximum operating temperature is 2,400°C. Furnaces like this are now being used for sintering tantalum capacitors.

The heating element is fabricated in tantalum or tungsten sheet. Radiation shields, together with all assembly nuts and bolts, are made from the former, thereby avoiding the use of troublesome refractories.

On the semi-automatic version, sequence selection is by means of a rotary switch, but over-riding switches permit any individual operation to be made.

The heating control can be slaved to the pressure instrumentation. Outgassing rate is automatically controlled by presetting the pressure gauge.

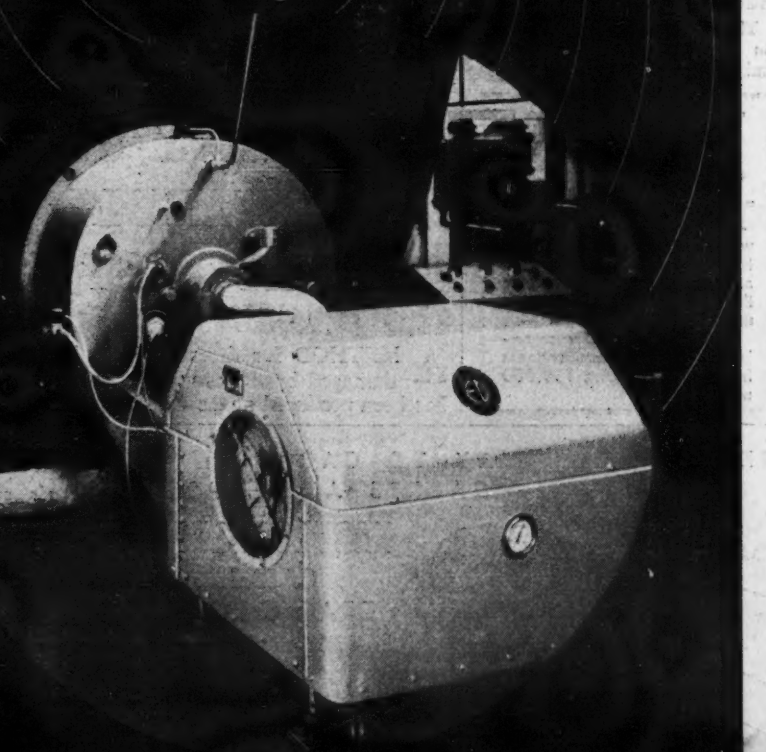
What is so special about the 'AIRSPIN' ROTARY CUP FUEL-OIL BURNER?

It is a high speed turbine driven burner designed by Edwin Danks of Oldbury,

—ESPECIALLY for shell and corner tube boilers.
—to be EASILY installed on new or EXISTING boilers.
—to atomise more efficiently the HIGHER-VISCOSITY oils now readily available.

EDWIN DANKS 'Airspin' fuel-oil burners are FULLY AUTOMATIC, SIMPLE and RELIABLE, EFFICIENT and SMOKELESS; and provide a WIDE CAPACITY RANGE.

Many other advantages are described and illustrated in Publication No. 1752. Please send for your copy to Edwin Danks at Oldbury or the nearest Branch Office.



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.....FOREIGN NEWS.....FROM OUR OWN CORRESPONDENTS....

INDIA: MORE MACHINE TOOLS

Domestic output will reach £150m. by 1965

BANGALORE

OVER 20 per cent of the machine tools supplied to India's metalworking industries in 1960 were constructed by her own machine-building industry, according to a report from Hindustan Machine Tools Ltd. During the past few years the Indian machine-tool industry has shown an impressive record increased output.

The average production figure for all industries was 163 points in 1960, as compared with 100 in 1951; the machine-tool industries recorded an increase to 1,163 points in 1960.

A milling-machine assembly line at Hindustan Machine Tools.

Following independence, the Indian Government entered into a technical collaboration agreement with Oerlikon Machine Tool Works, Buerle & Co., Switzerland, to set up a medium/heavy machine tool manufacturing unit in India.

The Hindustan Machine Tools factory at Jalahalli was established by the Government in the public ownership sector, with capital management participation by Oerlikons.

Since 1956 the Hindustan machine factory has accounted for almost 60 per cent of India's total production of machine tools, the company's output for 1960 being valued at £2.6 million.

Work on a second plant started in April 1960, and was completed, 10 months ahead of schedule, in June 1961.

Hindustan MT produce a range of 162 types and sizes of machines under licence agreements with European manufacturers.

The country's expansion programme also includes private sector units like Godrej & Boyce Ltd.; Atlas Works Ltd.; and Coopers Ltd.

It is estimated that while India's indigenous capacity for machine building will rise to about £150 million by 1965, the country's requirements of machine tools may exceed £300 million by then.

ISRAEL DEVELOPS SOFT-HARD CARBON STEEL

TEL AVIV

THE development of a new steel alloy, having an unusually wide range of hardness and softness, has been completed by Professor Ariel Taub, professor for mining and metallurgy at the Israel Institute of Technology (Technion), assisted by Dr. A. Rosen.

The alloy is called "graphitisable medium-carbon steel". It is soft enough to permit inexpensive die-making and machining but can then be tempered to the required degree of hardness at a fraction of the cost of conventional tempering.

The production process is stated to be simple; the first trial batch is being prepared at a small foundry in Haifa.

Professor Taub started his research into the problems of graphitisation in solid-state steel alloys about ten years ago.

Steelmakers in France, Switzerland and Germany have already applied for manufacturing licences.

Plastic surface for autobahn

BONN

PLASTICS materials are being applied as surface coatings on a test section of the Frankfurt-Kessel autobahn near Alsfelde, W. Germany. Various mixtures of thermosetting resins with sands are being used, which give a rough surface like sandpaper.

This particular section has been chosen because it is often necessary to spread salt on it in winter.

FEP film sealed with heat

GENEVA

CEMENTABLE Teflon FEP-fluorocarbon film that can be heat-sealed has been introduced by the Film Department of Du Pont de Nemours International S.A.

Improvements claimed for this material are high tensile strength and elongation, resistance to discolouration at high temperatures, and extended outdoor life.

This has been made possible by elimination of the thin coating of epoxy resin previously used to protect the treated surface side of the film.

Applications of the material using epoxy resin bonds include liners for glass-filament-wound chemical and cryogenic fuel tanks and cylinders, "anti-stick" ice release coatings on aluminium trays and release cladding on heated or chilled processing rolls.

Ferrari official discloses engine performance data

MILAN

AN official of the Ferrari concern, Dr. Ing. Gianni Rogliatti, has disclosed details of the evolution of the engines used in many of Ferrari's well-known racing cars.

During 15 years of car building, Ferrari designed more than 150 types of engines, utilising the talents of many engineers.

Beside the 12-cylinder V-engine, which became the most luxurious motive-power for Italian sports cars, engines of the four- and six-cylinders-in-line were built and raced.

Other models included the eight-cylinder V-engines of the Lancia formula, and six-cylinder V-engines of the "Dino" series—named after the son of Signor Ferrari, Dr. Ing. Dino Ferrari, who was tragically killed during a racing-car test.

The table gives some basic facts on engines made between 1947 and 1958.

FERRARI ENGINES of the 12-cylinders 60° V type.

Type	Year	c.c.	HP	HP litre	R.P.M.	stroke bore	Compr.	Specif. rate.
125	1947	1.497	72	48	5.400	0,95	8	26.600
166	1948	1,995	140	70	6.600	0,98	10	36.000
212	1949	2,562	150	59	6.500	0,96	8	38.000
375	1950	4,494	330	73	6.500	0,93	10	44.500
225	1951	2,715	210	77	7.200	0,84	9	42.500
250	1952	2,963	240	80	7.200	1	9	44.000
375	1953	4,522	340	75	7.000	0,81	9	48.500
250	1954	2,953	220	74	7.000	0.8	8	42.000
410	1955	4,961	340	69	6.000	0.77	8	43.000
290	1956	3,490	320	92	6.800	0,95	9	44.500
315	1957	3,781	380	100	7.600	0,91	9	51.000
330	1958	4.023	447	111	8.000	0,93	10	54.500
FERRARI ENGINES 4-CYLINDER IN-LINE TYPE								
500	1951	1.984	170	85	7.000	0,87	11	54.000
553	1953	1.997	190	95	7.500	0,79	13	57.000
555	1954	2,497	250	100	7.500	0,79	12	61.000
860	1956	3.431	310	91	6.200	1,03	9	58.500

TWO SOCIETIES MAY MERGE

TWO of the largest engineering societies in the world—the American Institute of Electrical Engineers and the Institute of Radio Engineers—are considering a merger.

The proposed new organisation would be international in scope and involve 150,000 members.

U.S. NAVY SCIENTIST REWARDED FOR LEAK TEST WORK

WHITE OAK, MD.

A METHOD for detecting leaks in items which would be damaged by the common vacuum-over-water test method has been produced at the U.S. Naval Ordnance Laboratory.

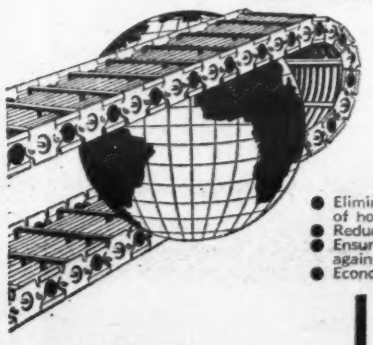
The device under test is placed inside a sealed tank subjected to air pressure. If the test device leaks, air seeps inside it and causes an overall pressure drop in the test tank which is recorded by a pressure gauge.

By knowing the free volumes of both the device and the test tank, the leak-rate of the device can be calculated.

Sensitivity of the method depends primarily on the sensitivity of the pressure-gauge and the size of the two free volumes involved.

According to Mr. R. A. Simon of NOL's Chemical Engineering Division, who received $275 for inventing the system, it is best adapted for devices with considerable internal free volume, although it is adaptable to smaller devices as well.

THE MODERN WAY TO CARRY CABLES AND HOSES



KABELSCHLEPP CABLE DRAG CHAINS

The most efficient support for carrying cables, hoses, etc., on machine tools, cranes, stackers, mining and shipbuilding equipment, or any movable machinery.

- Eliminates excessive bending or crushing of hoses and cables.
- Reduces friction to a minimum
- Ensures maximum reliability and safety against accidental contacts.
- Economical in space, simple to assemble

Write for catalogues and further details and suggested applications.

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TENSILE TESTS—AT 4·2°K

NBS laboratories design cryostats

WASHINGTON, D.C.

TWO tensile cryostats, capable of making tests at temperatures as low as 4.2 deg. K, have been developed by the Cryogenic Engineering Laboratory of the U.S. National Bureau of Standards Boulder Laboratories.

The first of these devices is capable of sustaining tensile forces up to 5,000 lb. The second has a load capacity in excess of 10,000 lb.

Differing not only in capacity but in construction and operation as well, both units offer the advantages of simplicity, safety, and low consumption of liquified gas.

The 5,000 lb. cryostat is used with standard tensile equipment. The tension linkage extends completely through a stainless-steel Dewar, and the specimen is submerged in liquid nitrogen during low-temperature runs.

Less heat flow

Force is transmitted across the vacuum space between the bottom walls of the Dewar, through a stack of metal washers, this arrangement having been found to result in less heat flow than a solid rod of the same dimensions.

A stainless-steel bellows is welded to the bottom of the inner shell to permit specimen alignment and to allow for thermal contraction.

The top of the flask is closed during runs by a foamed polystyrene cover. A gas-tight seal is formed between the lower end of the cover and a ring soldered around the outside of the cryostat by means of a thin rubber sleeve.

A tube for filling and emptying the cryostat runs down through the cover. The transfer-line extends down through this tube during filling and is removed and the hole corked during runs to reduce heat flow.

Electrical leads, a fluid-level float and the upper tension rod also pass through gas-tight seals in the cover.

When determinations are to be made at the temperature of a particular liquid, the cryostat is filled with the liquid so as to cover the specimen. The cryostat is precooled with liquid nitrogen prior to a helium run.

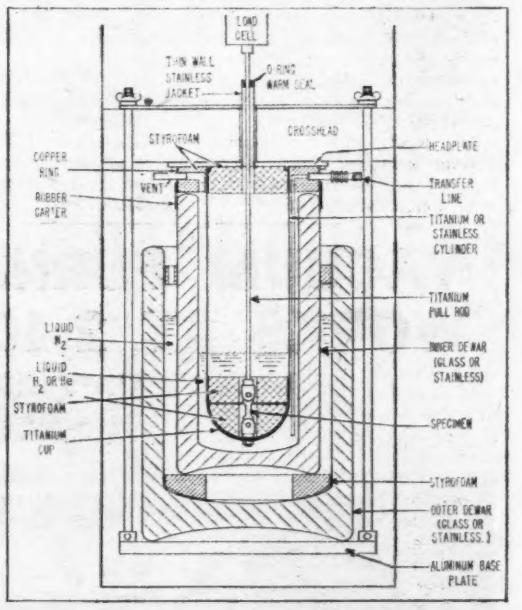
Tests made at temperatures intermediate to the boiling points of various liquids require an open-bottom plastic gas chamber to be attached to the upper tension rod so as to surround the specimen; when the cryostat is filled with liquid, the sample remains in a gaseous atmosphere.

Heat is supplied to the specimen by electric heaters on the specimen holders, and the temperature, as measured by thermocouples attached to the specimen, is maintained by automatic or manual control of the heater autotransformers.

In the second cryostat the tension apparatus extends into—but not through—the Dewar.

This feature allows glass Dewars to be used, as no strain is put upon the container itself.

The tensile load is applied in such a manner as to eliminate the need for low temperature seals—in fact, only one room temperature 0-ring seal is needed.



Schematic drawing of the tensile cryostat having a load capacity of 10,000lb. Stress is applied to the specimen by moving the crosshead downwards, the force being transmitted through the cylinder-cup arrangement.

NEW Equipment

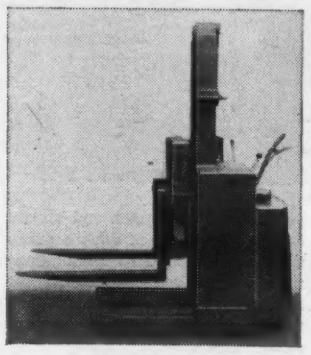
Battery operated fork lift truck

A BATTERY - OPERATED fork-lift truck, the Reachstack, has a capacity of 1,400lb. at a 20-in. load centre and has a 20-in. extended reach which can be obtained in three seconds. Two forward and two reverse gears are fitted and the maximum speed attainable is 4 m.p.h.

The steering assembly turns through a full 180 deg. lock and the steering, which is specially arranged for light and positive action, is directed through the tiller arm which also controls the band type transmission brake.

The truck can lift loads up to a maximum height of 72in. at a rate of 30ft. per min. Extras available include fork extensions, carriage load rests, crane attachments, ram attachments and higher lifts. **Montgomerie Reid Engineering Co. Ltd., Bramley Green, Hants.**

Reader service reference No. 255



FORK LIFT TRUCK
Lifts 1,400lb.

Process recorder

Up to 60 remote signal switches can be connected to the Le Boeuf process stage and fault recorder. The instrument has been widely used on the Continent to record faults and starting procedure in power stations, to allow the unattended operation of sub-stations, for monitoring, refining and gas producing plants, and in various chemical processes.

While conditions are static the chart of the recorder is stationary, but as soon as one of the remote switches sends a signal, it starts to move at the relatively high speed of 2cm./sec.

There is a tungsten tipped stylus for each column on the chart and recording takes place when a current is applied to a stylus. This has the effect of evaporating a metal film on the chart to leave a dark translucent mark. The width of the line produced depends on the amount of current flowing from the stylus.

Immediately a signal is received at the recorder, a number of operations take place automatically. Visual and audible alarms are given; the chart starts running; the time is recorded in hours, minutes and seconds; the identity of the signalling switch is recorded by a line appearing in one of the columns on the chart; and a time-base is provided by the printing of a line at one edge of the chart during every other half second.

Provision is made for a length of the chart to be cut off and removed at any time without putting the recorder out of action. The charts are approximately 33ft. long and visual and audible warnings are given when the last 2in. is reached.

The signal switches only have to carry about 4 milli-amps and, as the loop resistance of the connecting cable may be as high as 2,000 ohms, they can be a considerable distance from the recorder. **D. Robinson & Co. Ltd., 5 Church Road, Richmond, Surrey.**

Reader service reference No. 256

Safety torch

The Wefco hand torch, Mark 8, meets very close specifications laid down by the Ministries of Fuel and Power, Mines and Transport and Civil Aviation.

It also bears the Factory Inspectorate Certificate No. IS 3113 (Hydrogen / Ethylene / Pentane classes). The body is made of red polyethylene which, being gas and watertight, is suitable for industrial, marine and many other services.

Crack detection

A spray unit of the aerosol type but with separate containers for the propellant and the material to be sprayed has been developed for the application of penetrants, magnetic inks and similar materials used in crack detection.

It is called the Flexi-spray and the advantages of the design are

SPRAY UNIT
Self-contained

that solid materials in suspension and materials of high viscosity can be sprayed without fear of valve blockage, also penetrants can be purchased in bulk quantities.

The container for the penetrant is graduated in fluid oz. and is screwed into a plastic moulding which also holds the aerosol power pack. The valve mechanism is incorporated in the moulding.

A 14 oz. power pack will spray about 20 fluid oz. of a liquid whose viscosity is similar to that of kerosene, the figure being lower for higher viscosity materials. **Solus-Schall Ltd., County Building, Honeypot Lane, Stanmore, Middx.**

Reader service reference No. 258

All-purpose saw

A two speed, reciprocating saw, the Stanley 363 weighs 8lb. and, being only 14½in. long it can be operated comfortably between joists of 16in. centres.

At the high speed of 3,000 strokes per minute it will cut wood, plasterboard, and composition materials even with nails and screws embedded in them.

At 2,200 s.p.m. it will cut a wide range of metals, plastics and similar materials.

The blades can be mounted in six ways enabling the saw to be used in any cutting position. The saw can be converted to a jig saw, able to cut and shape materials up to 3in. thick.

Ball and needle bearings give vibration-free operation and window-type brush holders permit an easy check on brush life. **Stanley Works (G.B.) Ltd., Rutland Road, Sheffield 3.**

Reader service reference No. 259

Flash welder

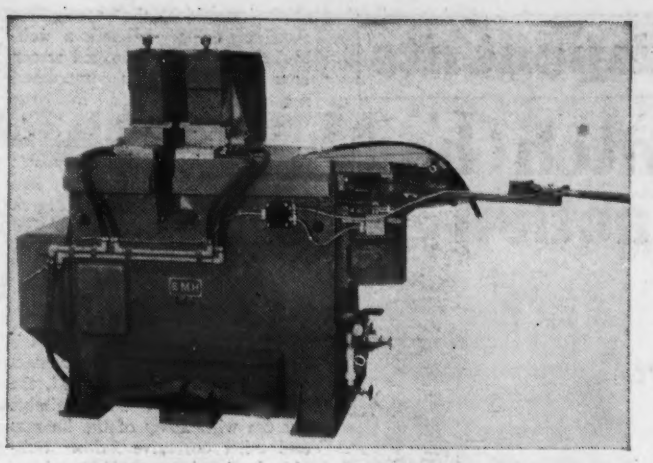
Pneumatic clamping is provided on the SBA 51 hand-operated flash or butt welder, the clamps operating vertically and exerting a pressure of approximately 3 tons. Clearance between the water-cooled copper jaws can be adjusted over a distance of more than 2¼in.

Either a single-phase 220 volt or three-phase 400-440 volt transformer can be supplied, the water-cooled secondary windings having five tappings which allow the power to be varied between 30 and 90 kVA. Nominal rating is 50 kVA.

Maximum cross sectional areas of work are tubes 1.55sq. in., flats 1.86sq.in., and bars 2.48sq.in.

The moving table is controlled by a hand lever and quadrant mechanism and various rates of burn-off can be set. Upsetting pressure can be adjusted between 2 and 3 tons for a force of 88lb. applied to the lever.

Welding current is controlled by



FLASH WELDER
30-90 kVA

a magnetic contactor and the cycle is initiated by a trigger on the traversing lever.

Any number of preheating strokes can be made to bring workpieces up to temperature. **Electro Mechan-Heat Ltd., Manor Works, Ettingshall, Wolverhampton.**

Reader service reference No. 260

Pipe bender

Thick-walled ferrous pipes of up to 6½in. diameter can be manipulated on the Hungs-Robie RE.5 machine. All types of tubing can be handled, also solid and profiled material.

Boiler coils, flat coils and spirals and bends on different planes down to a radius of 1½ times diameter can be produced. Maximum bending radius with a mandrel is 39⅜in.

Setting is by means of limit switches and it is possible to change the tooling without tools. Clamping is automatic and the pipe is unclamped during the return stroke of the machine.

Power is supplied by a 16-h.p. motor driving through vee belts. **Pressbend Ltd., 28 Marchalsea Road, London, S.E.1.**

Reader service reference No. 261

Bearing tester

A modification has been made to the E.M.O. bearing friction testing machine type TID.24 to give greater consistency in readings irrespective of who is applying the tests.

The instrument is designed to measure the break-away or starting torque of precision bearings. A variable torque can be applied to the bearing under test and the starting torque in gm.cm. read from a meter when the bearing just begins to rotate.

Axial loading is applied to the bearing by means of a light alloy disc resting on top of it as this provides the conditions required for the most searching check on accuracy, cleanliness and performance.

Previously the increase in torque necessary during the test has been controlled manually, the operator turning a knob at the side of the instrument until rotation commenced.

It has been found, however, that the speed at which the torque is increased can affect the readings obtained and so a synchronous motor has been added to drive the potentiometer which controls the applied torque.

Another modification is the provision of an electrical means of setting the peak torque value required on the meter. **E.M.O. Instrumentation Ltd., Western Road, Bracknell, Berks.**

Reader service reference No. 262

Shell core machine

A range of American shell core machines with gas heating are now available in this country. They cover the production of cores from a few ounces to 2cwt. in weight.

No foundations are required and only connections to air and gas supplies have to be made.

There is thermostatic control of the heating and it is possible to vary the rates of heating of the two face plates where, for instance, the core boxes are not symmetrical in design. **Ernest Fairbairn Ltd., 376 Strand, London, W.C.2.**

Reader service reference No. 263

NEW Materials

Low temperature welding rods

A RANGE of metal joining alloys developed in Switzerland for low temperature welding, brazing, surfacing and soldering are now available in this country.

They are to be sold under the name Fontargen and will be supplied in the form of coated electrodes for arc welding, also as rods and fluxes for oxy-acetylene, gas-air, induction, resistance and other heating methods.

There are a variety of joining materials for different base metals and applications. Rod A.101, for example, for general purpose steel work, gives a tensile strength of up to 45 tons/sq. in. and has a bonding temperature of 800°C.

Type A.700, for surfacing steel, cast iron and bronze, gives a Brinell Hardness No. of 180-200 and has a bonding temperature of 775°C.

Among the advantages claimed for joints made with these materials are less distortion and damage to the base metal, bonding and flowing are more effective, and there is no fused-on scale on the finished joint. **Welding Improvements Ltd., P.O. Box 32, Northampton.**

Reader service reference No. 264

Plastics pipe

At least fifty years life is claimed for a plastics pipe for cold water services. The material is Rigidex, a high density polyethylene copolymer, which will not corrode, is light in weight and very strong.

It is unaffected by temperatures as low as minus 70°C. and also shows a remarkable resistance to chemicals and oils.

Results of tests in accordance with B.S. 3284 show that it will withstand the required hoop stress of 710lb./sq. in. at 20°C. for upwards of fifty years. **British Resin Products Ltd., Devonshire House, Piccadilly, London, W.1.**

Reader service reference No. 265

Coated steel sheet

The range of patterns in which Stelvetite, the plastic-coated steel sheet, is obtainable has been increased as the result of an arrangement to allow any of the patterns held by the Calico Printers' Association to be specified.

Stelvetite was originally made in ten standard colours and a number of embossings but now it is possible to have such effects as a floral pattern, a leather look or a tweed finish.

Customers will also be able to specify their own patterns. The makers forecast that the new patterns will make a considerable impact in the domestic appliance field. **John Summers & Sons Ltd., St. Ermin's, Caxton Street, London, S.W.1.**

Reader service reference No. 266

Cold dip stripper

Strongly adherent paint films such as stoved epoxy resin, acrylic, alkyd-amino, and polyurethane enamels can be removed with Chemiclene No. 415 immersion paint stripper.

Components to be treated are first submerged in the stripper, which can be contained in ordinary mild steel tanks, then hosed, rinsed, or brushed off.

The stripper contains highly volatile solvents and, to prevent unnecessary loss by evaporation, it is used with an upper layer of water which acts as a seal.

The water also conserves the stripper by reducing drag-out. **Grant & West Ltd., Stoke Mill, Guildford, Surrey.**

Reader service reference No. 267

Copper base alloy

Mallory 328, a precipitation-hardened copper base alloy, has been developed as a resistance welding electrode material. High strength, maintained at working temperatures, is combined with good resistance to cracking and high electrical and thermal conductivities.

Applications include spot, seam, stitch and projection welding of various materials. Properties include: hardness, Rockwell B, 80-85, tensile strength, 35 tons per sq. in. **Johnson, Matthey & Co. Ltd., 73-83 Hatton Garden, London, E.C.1.**

Reader service reference No. 268

for all types of BRIGHT STEEL BARS

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Alloy Grades
.445" to 1.300"
A/F

CARBON GRADES
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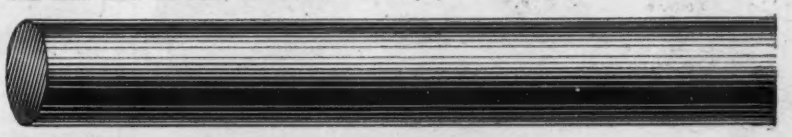

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LEEDS 5. Horsforth 2821

NEW Components

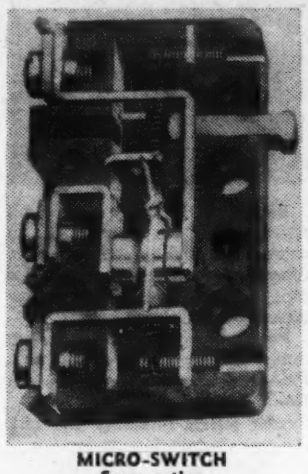
Micro-switch has rapid action

DESIGNED and developed to ensure rapid contact separation, the Chilton M.S.10 micro-switch is especially suited for arduous duty as a limit, control, and safety switch.

Many micro-switches use a biased spring to provide both contact movement and pressure. Therefore contact pressure is often reduced to zero just before the contacts change position. This can result in bounce, burning and overheating of contacts. The M.S.10 has been specifically designed to overcome these shortcomings.

In use the operating plunger initiates the action of the actuating fork which knocks the moving contact over to the opposite contact. The contact pressure is generated by a second spring pulling the contact carrier. This pressure is further reinforced by the pressure of the actuating fork and its spring which renders the switch immune to vibration. **Chilton Electric Products Ltd., Hungerford, Berks.**

Reader service reference No. 269



MICRO-SWITCH
Snap action

Heating controller

Latest Rototherm temperature controller has independent circuits providing for the control of two zones or two separate pieces of equipment. It consists essentially of two controllers in a single casing with individual adjustment of temperature setting.

Each of the control circuits comprises a temperature sensitive bulb, capillary and steel Bourdon tube operating a mercury switch rated at 30 amps, 250 volts a.c. The differential is fixed but varies according to the current to be switched.

Indicator lamps are fitted, the standard capillaries are copper sheathed, 10ft. long, and the mild steel bulbs are threaded ½in. B.S.P. Temperature ranges available cover −20°F. to 1,000°F. **The British Rototherm Co. Ltd., Merton Abbey, London, S.W.19.**

Reader service reference No. 270

Fluid connector

In order to prevent cross-connection of fluid lines, the Wiggins fluid connector is self-indexed. Designated the N4R Series Inst-O-Matic fluid connector, it is designed with multiple key and slot indexing that allows up to nine different index combinations in a given size.

It can be used in multiple line installations on panels or consoles or any installation where several fluid lines could become cross-coupled.

Aluminium construction is standard but stainless steel can be used to special order. Available in sizes from ¼in. to 1in. in ¼in. increments, operation pressure is 3,000lb./sq. in. and temperature range depends upon the seal material used. **Aero Controls Ltd., Industrial Estate, Weedon Road, Northampton.**

Reader service reference No. 271

Ejector door

This bar ejector door for swarf pulverisers ensures that any bar ends are removed before they can cause any damage to the screen bars. This is an important consideration since the continuous swarf centrifuge demands a well-broken swarf and damaged screen bars would permit uncrushed material to pass into the centrifuge.

The attachment is available for the whole range of the company's pulverisers and is inexpensive and simple to install. **Christy & Norris Ltd., Chelmsford, Essex.**

Reader service reference No. 272

Fluid pump

For use where the bearing lubricant must not come into contact with the fluid being pumped, the Orr G. P. pump is now available for use with many of the ketones and other corrosive fluids. Suitable for heads up to 115ft. with a 25ft. suction lift, the output range is 600 to 30,000 gal. per hour.

One of the applications is the fitment to road tanker vehicles where their light weight and lack of need of frequent adjustment and maintenance is invaluable. **Orr Products, Whitfield Works, Dudbridge, Stroud, Glos.**

Reader service reference No. 273

Pilot valve

The M.1 is a ¼in. BSP cam operated pilot valve suitable for controlling a pilot pressure operated valve or a small single acting cylinder. Of compact design, the valve body is made of aluminium and is provided with two fixing holes. **Stuart Davis Ltd., P.O. Box 21, Stonebridge Highway, Willenhall, Coventry.**

Reader service reference No. 274

Locknuts

Claimed advantages of the Parlox range of self-locking locks are; higher initial torque, higher maintenance of torque after constant applications and removals, and freedom from shredding of the nylon insert due to absence of sharp corners.

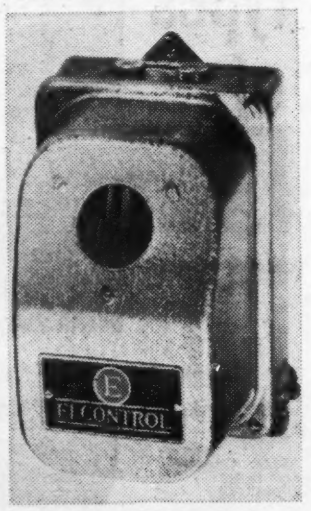
The locking insert is an extruded length of nylon reinforced with a core of hard-drawn steel wire. This is coiled into position instead of being moulded in one rigid collar.

The basic nut body is a cold formed nut of 35 tons minimum tensile strength into which is sunk a conical groove. Into this groove is pressed the fabricated boss, the nylon collar is then coiled in and finally the outer periphery is staked to the boss giving additional keying against rotation. This staking also acts as a thread identification code. **Parlox Ltd., 20 Avonmore Road, London, W.14**

Reader service reference No. 275

Lighting controller

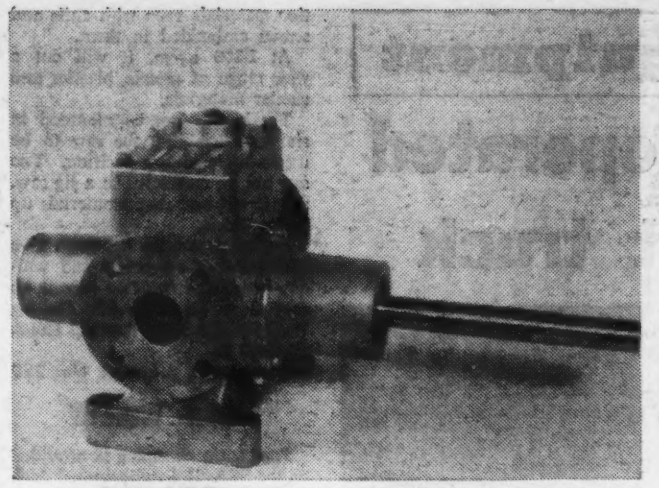
The Elcontrol PSL2 lighting controller is a small, self-contained photoelectric amplifier which controls switching on and off of electric lighting according natural daylight intensity.



LIGHTING CONTROLLER
Automatic switching

Measuring 9¾in. by 5¾in. by 5in., it has two controls, one for setting the falling light level to give the switch-on point and one for setting the rising level for the switch-off point. Control of the lights is effected by a set of relay contacts which may switch the lights direct or through a suitable contactor. **Elcontrol Ltd., Wilbury Way, Hitchin, Herts.**

Reader service reference No. 276



FLUID PUMP
Resists corrosion

Hydraulic unit

The Blackhawk P-707 air hydraulic pump has been designed for operation by the foot, elbow or knee, leaving both hands free to manipulate other equipment. The unit weighs 8½lb., has a 95:1 pressure ratio and on a maximum 19lb./sq. in. can tackle a full 10 ton loading without difficulty.

It can be used among explosive paint or petrol fumes and should the air supply be cut off, the pump will stop and hold its load. Pressure will only escape when the release treadle is kept depressed. **Blackhawk Ltd., 12/16 Brunel Road, Acton, W.3.**

Reader service reference No. 277

Pressure switch

Suitable for use where space is restricted, the Londex PS/MIN range of switches are designed for use with non-corrosive liquids and gases up to a maximum temperature of 100°C. The switches cover operating ranges from 10 to 180 p.s.i. and maximum pressures up to 300lb./sq. in. Pressure entry up to ¼in. or ½in. male B.S.P. thread and single pole changeover contacts are fitted rated up to 5 amps at 250v a.c.

A special double pole changeover version, type PS/MIN/DP, is also available.

The housing is nickel-plated machined brass and is fitted with an aluminium cover. The pressure sensitive element is a hydraulically formed seamless phosphor-bronze bellow.

Overall dimensions are 3⅛in. high by 1 13/32in. diameter. **Londex Ltd., Anerley Works, London, S.E.20.**

Reader service reference No. 278

Mixing valve

Thermostatic as well as flow control are combined in one compact unit in the Leonard 72 mixing valve. In this device the top control knob determines the volume of water flowing and the lower handle selects the desired temperature and maintains it regardless of volume or other influences.

Two basic types are available; one which can be fitted to exposed or concealed pipework and another for semi-concealment.

The 72 will operate satisfactorily under a minimum head of five feet and up to a maximum pressure of 120lb. per sq. in. and it will cope with a pressure variation between hot and cold supplies of up to 5 to 1.

The valve body is heavy gauge brass and internal working parts are plated for protection. For simplicity and speed of maintenance the valve is constructed on the cartidge replacement principle. Two units, the thermostat assembly and port assembly can be easily removed for cleaning or replacement as necessary. **Walker Crosweller & Co. Ltd., Cheltenham, Gloucester.**

Reader service reference No. 279

NEW Publications

An informative brochure from the Lighting and Heating Group of the General Electric Co. Ltd. is intended to explain as simply as possible the calculations, methods and terminology called for by the new Code of Recommendations for interior lighting issued by the Illuminating Engineering Society, also the British Zonal method for deriving coefficients of utilisation for lighting fittings. The necessary data for the calculation of coefficients of utilisation are given for the principal ranges of G.E.C. fittings.

Reader service reference No. 280

A folder dealing with Servomatic high speed hydraulic grinding spindles is available from Reilly Engineering Ltd. The spindles are designed round hydrostatic bearings; the rotors float on pads of fluid and there are no balls, rollers or tracks. Speeds of up to 120,000 r.p.m. can be obtained, allowing the grinding of bores down to 1/32in. in diameter. The spindles are driven by separate power packs with a normal working pressure of 1,500 lb/sq. in. The folder also deals with the Servomatic electronic tachometer for the accurate measurement of speeds up to 200,000 r.p.m.

Reader service reference No. 281

An illustrated brochure issued by The Plessey Co. Ltd., lists a wide range of ceramic valveholders. U.K., Continental and American types are included together with a range in the B7G and B9 A types which have recently been approved to DEF 5251. Technical information includes dimensional drawings and mounting details for each type with full electrical and mechanical specifications. Also shown are valve screens, screening sleeves and retaining springs.

Reader service reference No. 282

Two leaflets issued by James Gordon & Co. Ltd. give applications and circuit details of their electrical automatic control for small boilers and the Konitest dust meter. The small boiler control is intended for smaller installations where previously there were only relatively expensive controls available which were primarily designed for large boilers. The Konitest dust meter enables the dust content of air and gas to be monitored. This is of great importance to many industries and laboratories.

Reader service reference No. 283

A 16-page brochure has been produced by the Cambridge Instrument Co. Ltd. on their range of humidity indicating, recording and control instruments. There are sections on methods of measurement and applications, and the instruments covered include mechanical and electrical wet and dry bulb recorders, combined temperature and humidity recorders, and various types of controller including a multi-point electronic recorder-controller.

Reader service reference No. 284

Transistor Switching Equipment, a new leaflet from the Electronics Division of Bruce Peebles & Co. Ltd., deals with a standard range of switching equipment designed to replace conventional mechanical limit switches and to provide the basis for contactless switching systems.

Reader service reference No. 285

A catalogue on flat transmission belting has been issued by Turner Brothers Asbestos Co. Ltd. The various type of belt produced are described, e.g. square edge, rounded edge, fire resistant, and there is some useful information on types of belt fastener, drive design, and calculations, and tables on power capacities and pulley circumferences.

Reader service reference No. 286

READER ENQUIRY SERVICE

November 23, 1961

Please circle the reference number on the item on which you would like further details. Post to Reader Service Department, Engineering News, Heywood & Co. Ltd., Drury House, Russell Street, London, W.C.2.

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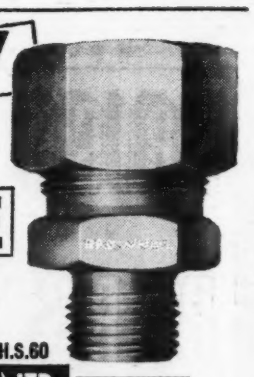

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ENGINEERING CONTRACTS

BIG AEI ORDER FROM NORWAY

THE most powerful water wheel generator yet made in Britain is to be manufactured by Associated Electrical Industries for the Norwegian State Power Authority, Norges Vassdrags-Og Elektrisitetsvesen.

Rated at 140,000 kVA, 300 rev/min, 17,000 volts, the machine is to operate with a 150,000 hp vertical Francis turbine in an underground power station 100 miles west of Oslo. The generator will be made in the Rugby works of AEI and at Manchester It is expected to be delivered by the end of 1963.

* * *

Steel industry developments are responsible for three orders for crane controls and lifting magnets placed with Brookhirst Igranic, a company of the Metal Industries group.

Fourteen sets of a.c. crane controls for English Steel's new Tinsley Park steelworks, Sheffield, have been ordered by Sir William Arrol and Partners.

Second order

Two d.c. crane equipments and ten rectangular lifting magnets have been ordered by Babcock and Wilcox for the South Durham Steel and Iron company's 20-ton rigid masttype overhead travelling cranes.

A third order is for 13 heavy duty electro-magnets for the new Spencer steelworks of Richard Thomas and Baldwins near Newport, Monmouthshire.

* * *

Ets Havalange, of Brussels, ordered two British fork lift trucks at the Factory Equipment Exhibition, Earls Court. Both trucks are products of the Matbro company, of Horley, Sussex. One has a lifting capacity of almost three tons up to 16 ft.; the other of nearly two tons up to 9 ft.

* * *

Turbo-generating equipment for one of their dyeing subsidiaries, the Standish Company, of Wigan, has been ordered from W. H. Allen, of Bedford, by the Bradford Dyers' Association of Bradford.

The plant is made up of two 800 kW geared, back pressure turbines each driving an Allen 3.3 kV alternator at 1,500 r.p.m. through an Allen-Stoeckicht epicyclic speed-reduction gearbox.

* * *

Vickers-Armstrongs (Engineers) are to build, at their Elswick, Newcastle-on-Tyne works a Scott Vickers rotary newspaper press for the Calacutta office of the Indian newspaper, The Statesman.

Basic plant

The basic installation will provide for printing either two eight page broadsheet newspapers or one sixteen page broadsheet newspaper. Later extension of the plant will make a 48-page paper possible. The Statesman is published in Calcutta and Delhi.

* * *

Against intense competition Marconi's Wireless Telegraph Co., have won orders from the Royal Board of Swedish Telecommunications to supply 82 television and sound broadcasting transmitters.

The transmitters are to augment Sweden's television and VHF frequency-modulated sound broadcasting systems, providing first-class reception in the north and in existing fringe areas.

The contract is for 21 vision transmitters, 21 sound transmitters, and 40 frequency modulated transmitters, plus associated programme input, paralleling, feeder, and ancillary equipment.

FINANCE AND COMMERCE

SCOTLAND 'NEEDS NEW DEAL'

Growing industries should beat employment problems

THE "science-based" industries, the new capital goods industries, and the engineering-based consumer durable industries are the three hopes for the improvement of the Scottish industrial structure in the report on the Scottish economy made by the Toothill committee.

On the omparatve lack of diversification in Scotland the committee, presided over by Mr. John H. Toothill, a Ferranti director and general manager of Ferranti, Edinburgh, observes that diversification is likely to be difficult at any time.

But when profitability declines in long-established concerns there is likely to be extreme difficulty in diversifying if fundamental changes in the character of production engineering and marketing relationships are implied.

A vital point raised by the committee is that the existing official measures for attracting firms to Scotland lose some of their effect because the companies cannot be sure how much help they can get.

Suggestions

They are often left in a state of uncertainty for prolonged periods after making application.

The correction suggested is that standard minimum benefits should be made known in advance, together with those special arrangements under which organisations could negotiate higher benefits to suit particular cases.

Room for local initiative is left in the reminder that the role of the Board of Trade is to sell the inducements in an overall manner and that it is for the region to put over its own special location.

It is still a revelation that in the seven London new towns of the Eastern Region manufacturing industry has provided more jobs than have all the new firms that have moved into Scotland since the end of the war.

Move to south

Almost 250,000 workers moved to the Midlands and the South from Scotland, Wales, and the North of England between 1950 and 1960, the net outflow from Scotland being almost twice as high as from any other region of Britain.

Some of the main suggestions from the report are that promising industrial centres should be built up as a principal aim of official policy: standard loans of up to 50 per cent of capital required for general financing should be made for a period of 10 years, the first three to be interest free.

FOR RESEARCH OR ROUTINE

This Ultrasonoscope Mk. 2 flaw detector, made by Glass Developments, of London, S.W., can be used for routine testing, or for fundamental research. The instrument may be applied to problems ranging from building bricks to rocket motors.

TRADE AGREEMENTS

U.S. LICENCE FOR ENGLISH FIRM

CONTINUING its diversification programme, the **Fairey Engineering Co.** has entered an exclusive agreement for the manufacture and sale in the U.K. of Firestone stainless steel containers.

Until complete production begins, probably in some months time, casks and containers are being imported from Canada. The stainless steel containers are used for beer, milk and as pre-mix and post-mix beverage tanks. The agreement is with the **Firestone Tire and Rubber Co.** of Akron, Ohio.

Another diversification move comes from the **Valor Co.**, who produce oil and gas fired boilers and electric radiators and convectors at Erdington, Birmingham.

Valor have acquired the business of the **Andersay Engineering Co.**, of Abingdon, Berks.

Andersay have been making metal stools, step ladders and ironing tables. Valor will continue to make the tables and stools at Erdington, using the Andersay trade mark.

Union Carbide's Kemet Division are now selling an extensive range of solid tantalum capacitors. This type of capacitor gives space, weight and reliability advantages in replacing existing foil and wet electrolyte types.

The company's solid sintered slugs more than meet the demands of US Military Specification MIL-C 26655A.

All export operations of the **General Electric Co.'s** Installation Equipment Group are now being carried on from Perivale, Middlesex.

The full address of the export division is now: The General Electric Co. Ltd., Installation Equipment Group, Export Division, Horseden Lane South, Perivale, Greenford, Middlesex.

Export opportunities

INDIA: One metal cutting vertical hand saw. Specification: Automatic feeding arrangements, tilting arrangements for table, coolant pump, band filing guides, circle cutting attachment, brazing attachment.

Table size approximately 25in. by 35in. Throat size about 16in. maximum, work height about 9in. Bids to the Purchase Officer, Atomic Energy Establishment, Trombay, Mohatta Building, Palton Road, Bombay 1, quoting Tender No. AEE/P/CAP/5938. Closing date December 14. ESB 35123/61.

Motor Control System. One motor control system with three sets of ½h.p. motors with built-in reduction gear, clutches and starters and switches. Bids to the above address, quoting Tender No. AEE/P/CAP/5712. Closing date December 15. ESB 35122/61.

PAKISTAN: One diesel crawler tractor, flywheel horse power, 93, rated sea level, with bulldozer. Bids to the Director of Supply, PIDC House, Motijheel, Decca, quoting schedule to Tender No. EPS/VIII/1519/ENGG/61. Closing date December 5.

NEW ZEALAND: Switchgear. 6,600 volt Switchgear for installation in the Mt. Wellington power station of the Auckland Electric Power Board. To control the incoming supply from 22,000/6,600 volt transformers and outgoing feeders.

The system is three phase, 50 cycles, 6,600 volts, but may later be changed to 11,000 volts.

Transformers are connected "Delta" on the 22 kV side and "Star" on the 6.6 kV side. The system operates normally with the neutral solidly grounded.

Standard phase rotation is red, yellow, blue, reading left to right when facing the front of the switch board.

Bids to the chairman, Auckland Electric Power Board Building, Queen Street, Auckland C.1, quoting Tender No. 58/61. Closing date January 19, 1962. ESB 34994/61.

Inquiries should go to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, W.C.1, before dates given. References (ESB) should be quoted.

U.S. firm acquire Opperman shares

The Philadelphia, USA, Limitorque Corporation, is to acquire a 12 per cent interest in the Ordinary Capital of Opperman Gears (Holdings).

Opperman already have close working relations with the U.S. firm and the company's chairman, Mr. W. B. McCurd, states that the directors welcome the suggestion from Limitorque.

They say the company should be given the opportunity to hold an interest in the British concern.

Export's golden rules

THESE three golden rules for successful selling in the European market were given by Sir William MacFadzean, chairman of the Export Council for Europe, in London last week. They were: produce goods of the right design and type; sell hard at the right prices; deliver on time, following with first class after sales service.

Taking the chair at the conference "Producing for the European Market" held in association with the Factory Equipment Exhibition, Sir William said that competition was no longer between companies A, B and C in this country but between A, B and C in all countries.

The managing director of the Mosley Manufacturing company told the conference that the financial risk in exporting was not as great as selling in the home market, for two reasons.

Credit rating

The Exports Credits Guarantee Department would carry out a confidential investigation and tell the company the amount of credit that could be allowed an overseas customer.

And the department would usually insure up to about 85 per cent of the order.

Secondly, it was possible, with ECGD cover, to get the help of a merchant bank and he had found one particular bank very helpful.

RECORD FOR WALMSLEY

THE Walmsley (Bury) Group of pulp and paper-making machinery manufacturers have an order book that is now higher than at any time in the history of the company.

Mr. Percy Holland, the group chairman, has stated that 75 per cent of the orders on hand are for export, to 28 countries.

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T13 Super Capacity 30 cwts. Mechanical advantage 43:1. Weight 39lb.
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FINANCE AND COMMERCE

£75m. DEVELOPMENT OUTLAY

Tube Investments account for 2 p.c. of all U.K. metals exports

DEVELOPMENT outlay by the Tube Investments group over the next five years will be approximately £75 million. Financing this vast plan, says Sir Ivan Stedeford, the TI chairman in his annual review, "does not set a serious problem."

Over the past five years which have seen the swiftest expansion of the group, its disposable resources have increased by £120 million; group earnings have risen by 85 per cent (half of this from companies which were TI before 1956); and the effective growth rate of the companies has been eight per cent a year.

For the sixth year in succession Sir Ivan is able to report record results. Turnover went up by 20 per cent. Total trading profits rose by £1,753,660 to £20,961,123.

This nine per cent improvement was reached despite a higher depreciation cost of almost £1.3 million, and a fall in the earnings of the British Aluminium group of £1.7 million.

Steel tubes busy

Bearing in mind the susceptibility of groups such as TI to the state of the national economy, Sir Ivan sees the year's trading figures as a satisfactory result.

With total trading profits up by nine per cent, the net earnings of the group rose by almost 15 per cent. The aluminium side, the cycle division, and the electrical interests were "less rewarding". Activity in capital goods and associated industries kept the steel tube, engineering, and general divisions busy.

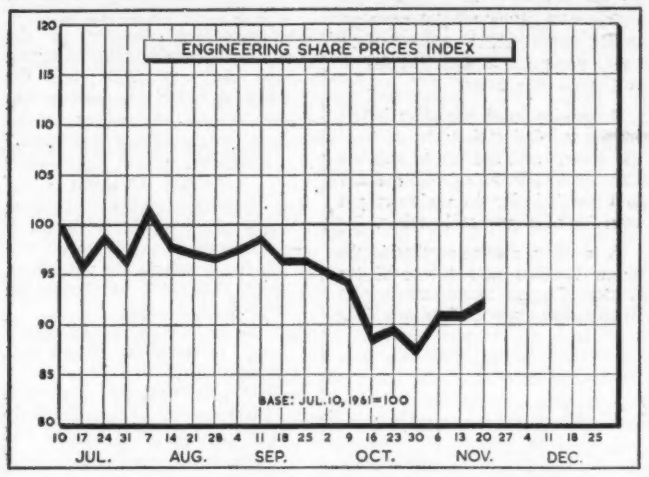
Only "shallow comfort" is provided by the official exhortation to the steelmaking companies to absorb the increased costs of coke, labour and fuel oil, for higher levels of productivity are prevented by official restraints upon demand. The TI steel companies are reported to have done well on a much increased turnover.

The companies of the engineering and general divisions improved their export orders by 17 per cent. A steady growth in the overall sales of capital goods is predicted.

. Pushing up their annual sales by 25 per cent, the W. H. A. Robertson Co., of Bedford, ended the year with a full order book for rolling mills, wire drawing, heavy shears, and other specialised plant. Another big extension to the works is planned.

The steel companies doubled their exports and increased total sales by 15 per cent. Overall earnings were down due to unduly narrowing margins and the results would have been even less satisfactory if there had not been improvement in the Royal Oak Steel Works returns, due to the elimination of technical difficulties.

Total direct TI investments (making no allowance for those going in other people's products) made up more than one per cent of all UK exports, or two per cent of all UK metals and engineering goods exports. Exports to Europe went up by 30 per cent.



NABM seek 'writing-off' tax cut

MORE generous tax allowances for the writing off of modern plant and equipment in industry are called for by the National Association of British Manufacturers.

On export incentives, the NABM says these are necessary to cover the extra costs of becoming established in new markets or expanding sales in old ones.

Setting out these views in the current issue of its journal "The British Manufacturer", the NABM goes on, "The governments of other countries find ways and means of providing these incentives and there seems no particular reason why our Government also should not do so."

One possibility mentioned is that profits tax should not be charged on overseas sales, this relief serving to offset the increased costs and work involved in export selling.

"Increased prosperity at home would counteract any fall in revenue arising from these changes in taxation, and industry would be well equipped to meet the challenge of the Common Market."

Chancellor's stimulus increases trading

WEEK IN THE CITY
BY OUR CITY EDITOR

SHOWING their usual capacity for making the best of any item of good news, industrial share markets made further headway last week, though best levels have not always been maintained. Trading volume, though still not heavy, has expanded appreciably.

Again it has been the Chancellor who has provided the stimulus. Mr. Lloyd told the National Association of British Manufacturers that the improvement in world trading conditions might create a favourable opportunity for Britain to move on from emergency or crisis steps to the shaping and development of longer-term policies.

'Bullish' reaction

Mr. Lloyd said a good deal more, about the need for more exports and about other economic problems still confronting the nation, but the market optimists seem to have had regard only to the "bullish" aspects of the Chancellor's speech.

Not every section shared in the improvement and there has again been some discouraging company news to keep prices in check. Steels have been a notably unsettled market, ahead of the steel dividend season. Most steel companies make up their accounts to end-September and will be reporting their results soon.

Steel output low

Production of steel has recently been well below capacity and this factor, together with pressure on profit margins, cannot fail to be reflected in profits.

One firm of stockbrokers has suggested that John Summers and possibly Dorman Long may not be able to maintain their final dividends.

The makers of special steels appear still to be doing well though in his statement with the full accounts of Samuel Osborn, Mr. Frank Hurst, the chairman, reports that the group appears to be running into a slacker period. The works are still very busy, but the intake of orders has slowed down.

Results of the motor car firms and their suppliers continue to reflect the recession in the industry, but some good figures have been produced by J. Brockhouse, whose activities include drop-forging, ironfounding and the manufacture of trailers.

TI 'prepared'

Profits before tax are up from £1,107,000 to £1,255,000, and cover for the maintained 12½ per cent dividend has risen from 2.0 to 2.3 times.

In his statement with the annual report of Tube Investments, Sir Ivan Stedeford deals at length with the group's activities and prospects. Although cautious about the short-term outlook, he shows that "Tubes" is well prepared to take advantage of any opportunities for increasing trade.

Large sums have already been spent on modernisation and expansion, but the "Tubes" directors are planning to spend about £75 million on a five-year development programme. They expect to be able to meet the cost without raising more long-term capital and without restricting dividends.

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Nov. 20	Ch'ge	Y'ld p.c.	1961 High	1961 Low	Stock	Nov. 20	Ch'ge	Y'ld p.c.
47/9	30/9	Allen, Edgar (£1)	32/-	+3d.	8.3	57/-	44/9	Lister, R.A. (£1)	56/-	+1/-	4.9
43/-	25/-	Allen, W. H. (£1)	25/6	+6d.	7.5	51/9	36/-	Mather & Platt (£1)	39/6	+2/9	5.5
77/-	58/6	Angus, George (£1)	67/6	...	5.9	67/-	46/-	Metal Industries (£1)	52/6	+2/9	5.7
31/10½	19/-	A.P.V. (10/)	32/-	...	3.4	71/3	53/4½	Morgan Crucible (£1)	59/9	+1/-	4.6
14/1½	8/10½	Asquith Machine Tool (5/)	10/6	...	2.3	31/-	16/9	Morris, Herbert (10/)	16/9	–2/-	8.1
48/6	29/-	Assoc. Electrical Ind. (£1)	33/9	–3d.	8.8	52/-	37/3	Murex (£1)	40/6	+1/-	6.3
16/5	11/8	Assoc. Engineering (5/)	13/9	+3d.	4.8	49/6	40/6	Neepsend Steel (5/)	41/6	–1/3	5.9
110/-	83/-	Averys (£1)	93/9	+11/3	3.2	31/6	20/6	Newton Chambers (5/)	22/-	+1/6	4.4
36/9	20/-	Babcock & Wilcox (£1)	22/9	+1/6	...	41/3	20/7½	Parkinson Cowan (£1)	21/4½	+9d.	8.2
59/6	40/6	Baker Perkins (£1)	45/6	+6d.	4.9	72/9	47/-	Parsons, C. A. (£1)	53/-	+9d.	4.6
9/7½	5/10½d.	Beyer Peacock (5/)	7/4½	+4½d.	7.8	40/3	38/-	Plessey (10/)	44/6	+1/9	3.3
77/-	45/-	Birfield (£1)	63/9	+1/9	3.1	33/-	16/-	Pressed Steel (5/)	17/3	+9d.	...
102/10½	65/-	Birmid Industries (£1)	65/-	–5/3	6.1	25/3	19/9	Qualcast (5/)	22/6	+1/6	3.9
36/10½	19/6	Birmingham Small Arms (10/)	21/9	–1½d.	5.3	38/1½	22/3	Radiation (£1)	24/10½	+2/6	7.9
45/6	33/6	Brockhouse, James (£1)	38/6	+3/-	6.6	22/6	14/-	Ransome & Marles (5/)	15/6	...	4.3
28/9	22/2	Broom & Wade (5/)	25/3	...	4.4	28/6	22/6	Ransomes, Sims & Jeffs (£1)	23/6	+6d.	6.4
42/6	29/9	Brotherhood, Peter (10/)	31/3	+1/6	7.8	50/6	34/6	Renold Chains (£1)	44/-	+4/3	4.5
48/9	30/4½	Brown, John (£1)	32/9	–9d.	6.6	52/3	38/-	Reyrolle, A. (£1)	43/-	+1/6	4.5
8/6	4/3	Cammell Laird (5/)	4/6	+3d.	...	9/1½	3/4½	Richardsons Westgarth (10/)	3/9	+4½d.	...
39/6	29/3	Carrier Engineering (5/)	30/3	+6d.	4.0	9/3	4/7½	Roberts, Charles (5/)	4/7½	–4½d.	...
54/3	36/6	Clarke Chapman (£1)	39/3	+3d.	6.9	48/6	37/9	Rolls-Royce (£1)	38/4½	+7½d.	5.7
14/9	9/6	Cohen, George (5/)	9/9	–1½d.	6.3	32/6	20/-	Ruston & Hornsby (£1)	20/6	–6d.	8.5
33/10½	21/8	Coventry Gauge & Tool (10/)	29/7½	+4½d.	4.1	19/3	12/10½	Serck (5/)	13/-	+1½d.	4.7
12/3	7/3	Craven Brothers (5/)	9/-	...	4.6	23/9	12/4½	Shaw, Francis (4/)	12/4½	...	6.2
24/-	17/6	Crofts Engineers (5/)	20/6	...	4.0	12/-	7/9	Sheepbridge Engrg. (5/)	7/9	–6d.	9.1
39/7½	30/-	Davy-Ashmore (5/)	31/-	+1/-	4.3	32/4½	19/1½	Simms Motor (5/)	25/-	+1/6	3.4
70/-	44/3	De La Rue (10/)	58/-	+8/6	3.8	44/1½	29/7½	Simon Engineering (5/)	32/7½	...	4.1
27/7½	19/9	Delta Metal (5/)	21/3	+6d.	4.6	23/9	13/9	Smith, S. & Sons (4/)	16/-	...	4.9
68/9	50/-	Desoutter (5/)	53/6	...	3.1	15/3	11/-	Solar Industries (5/)	11/1½	+1½d.	7.8
41/3	31/9	Dowty Group (10/)	32/7½	–4½d.	4.7	45/7½	24/7½	Staveley Industries (£1)	24/7½	–1/9	8.8
32/10½	22/4½	Edwards High Vacuum (4/)	31/9	+1/9	1.8	32/6	18/6	Steel & Co. (5/)	31/9	+1/-	3.5
52/-	35/3	Elec. & Musical Ind. (10/)	42/4½	+4/1½	4.1	67/-	38/-	Stone-Platt Ind. (£1)	38/-	–1/3	...
38/-	25/9	Elliott-Automation (5/)	37/9	+2/-	1.8	20/4½	14/-	Tecalemit (5/)	15/6	+3d.	5.7
40/6	26/3	English Electric (£1)	31/6	+6d.	6.2	17/4½	12/6	Thompson, John (5/)	12/7½	+1½d.	2.0
37/3	22/10½	Firth Cleveland (4/)	23/6	+7½d.	5.5	7/-	4/-	Thornycroft, John (4/)	4/-	–3d.	8.6
39/6	24/3	G.E.C. (£1)	28/3	+6d.	7.2	17/6	11/6	Toledo Woodhead (4/)	15/10½	–6d.	5.0
65/-	48/-	General Refractories (10/)	48/3	–6d.	5.1	85/6	55/-	Tube Investments (£1)	66/6	–1/9	4.1
66/6	47/6	Glenfield & Kennedy (£1)	47/6	–1/3	...	38/4½	25/9	Vickers (£1)	27/3	+1/4½	7.2
108/7½	76/-	Guest, Keen & Nettlefold (£1)	77/9	–5/3	4.1	157/6	122/6	Walmsley (Bury) (£1)	133/9	+6/3	3.3
48/7½	26/6	Haden, G. N. (5/)	31/-	+1/-	3.1	84/6	64/6	Ward, Thos. W. (£1)	66/-	+6d.	4.1
16/6	12/1½	Hall-Thermotank (5/)	12/10½	+6d.	4.2	17/9	10/1½	Weir, G. & J. (5/)	11/-	+10½d.	8.0
24/-	13/4½	Harland & Wolff (£1)	13/4½	...	7.2	47/6	28/4½	Wellman Smith Owen (5/)	28/7½	–1/1½	3.7
33/3	22/1½	Hawker Siddeley (£1)	23/3	+1/1½	9.3	14/1½	10/-	West, Allen (5/-)	10/1½	+1½d.	6.5
31/-	19/9	Head Wrightson (5/)	22/-	+2/-	3.5	46/3	24/9	Westinghouse Brake (£1)	26/-	...	8.3
79/9	51/6	Herbert, Alfred (£1)	65/-	+3/-	4.2	36/6	18/6	Whessoe (5/)	18/6	...	7.2
95/6	70/-	Hick Hargreaves (£1)	70/-	–1/3	5.8	17/-	12/-	Wilmot-Breeden (5/)	15/-	+9d.	3.7
138/9	101/3	Hopkinsons (£1)	108/9	...	5.0	30/-	19/9	Woodall-Duckham (5/)	20/3	–3d.	5.1
25/-	18/6	Howden, James (5/)	20/9	+9d.	5.9	64/9	44/6	Worthington-Simpson (10/)	48/6	+9d.	5.1
33/9	22/7½	International Combus (5/)	25/4½	+1/3	5.8						
IRON AND STEEL											
43/6	25/7½	Brown Bayley (10/)	35/9	...	4.4	42/-	22/7½	South Durham Steel (£1)	22/7½	–1/6	10.4
81/3	49/-	Colvilles (£1)	51/1½	–1/10½	6.2	47/8¼d.	31/4½	Steel Co. of Wales (£1)	31/4½	–2/6	7.8
32/3	21/4½	Consett Iron (£1)	21/4½	–9d.	8.7	57/4½	37/10½	Stewarts & Lloyds (£1)	37/10½	–2/3	7.8
43/7½	24/9	Dorman Long (£1)	24/9	–10½d.	8.0	58/7½	42/1½	John Summers (£1)	43/1½	–3/-	6.9
55/1¼	37/6	Firth & Brown (£1)	39/9	–2/9	6.2	55/7½	38/-	United Steel Cos. (£1)	39/10½	–3/6	6.1
49/10½	31/1½	Lancashire Steel (£1)	32/6	–3/-	6.6	63/6	46/-	Whitehead Iron & Steel (£1)	48/-	...	6.1

The companies whose share prices are quoted in the Engineering table and which form the basis of the Index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Due adjustments for Rights and Scrip issues are made. The Index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the Index.

INDUSTRIES USE MORE GAS

A SHARP rise in the demand for gas space heating is revealed by the 43 per cent increase over last year in the number of gas space heaters sold in the April-June quarter of this year.

Gas cooker sales were only one per cent down on the equivalent quarter of last year; water heating appliances fell by 13 per cent; refrigerators by eight per cent; and laundry appliances by 20 per cent.

Gas consumption rose slightly over the April-June quarter of 1960; industrial sales were up two per cent, domestic sales by 0.5 per cent.

A fall of almost four per cent took place in sales to commercial and other consumers.

About the same quantity of coal was carbonised. Coke production fell by just under 0.5 per cent, and the total gas made and bought went up by more than one per cent.

NEW Companies

Born Heaters Ltd., 3 London Wall Buildings, E.C.2. To carry on the business of manufacturers of and dealers in plant for or in connection with process heating, etc. Nominal capital £5,000.

Connevans Ltd., 26 High Street, S.W.19. To carry on the business of electronic equipment specialists, etc. Nominal capital £100.

Doval (Engineers) Ltd., Reliant Works, St. Thomas Road, Tean, Staffs. To take over the business of engineers carried on at Tean by Caroline Hawley and Stanley Williams, etc. Nominal capital £10,000.

Elremco Sales Ltd. To carry on the business of electrical and mechanical engineers, etc. Registered by solicitors, G. Houghton and Son, E.C.2. Nominal capital £1,000.

Technicon Instruments (Overseas) Ltd. To carry on the business of engineers, scientific instrument manufacturers and dealers, etc. Subs: Donald A. Marchant and John E. Emptage, 66 Queen Street, E.C. Nominal capital £100.

F. A. Wellsford and Company Ltd., 38/40 Fife Road, Kingston-on-Thames, Surrey. To carry on the business of industrial consultants. Nominal capital £100.

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

Cheaper Albion

Increased output of the 7-ton Leyland Albion Chieftain truck chassis has been followed by a substantial cut in the price. These chassis, manufactured by Albion Motors, of Glasgow, a Leyland subsidiary, will now be sold at £35 below the previous models, both at home and overseas.

Emidec 1100 for bank

BARCLAYS BANK have ordered a second EMI Electronics' computing system, following the success of the first EMIDEC 1100 computer installed at the Bank's No 1 Computer Centre.

The second, to be housed in a room alongside the No 1, will be used on centralised book-keeping of current accounts for an additional group of London branches.

Staffing difficulties and the overcrowding of premises due to the increasing volume of work have been lessened by computer techniques. A high degree of reliability is obtained in the computer with the use of magnetic cores and of transistors throughout.

The second EMIDEC 1100 will go in late next year.

DIE-CAST WORKS IN 30 WEEKS

ALUMINIUM die-casting plant for Rootes Motors (Scotland) to be built at Linwood, Paisley (Engineerings News last week) has been contracted to Holland & Hannen and Cubitts (Scotland) on a schedule of only 30 weeks.

Work is beginning immediately and is due to be completed on June 11.

Built of steel framed construction on part-reinforced concrete and part-piled foundations, the factory will have reinforced concrete floor slab, faced brick waist walls, patent glazing and aluminium cladding to sides. There will be a north-light roof with metal decking.

GERMANS GET EXPORT AID

A WEST GERMAN firm is to make a substantial investment in the production of diesel railway locomotives in Argentina, once traditionally provided with her railway equipment from Britain.

Ferrostaal Aktiengeselschaft, an Essen company, has been authorised by the Argentine authorities to bring in, tax free, machinery worth 2.8 million dollars. The machinery will be operated at the works of COMETARSA, a local company.

WORKING IDEAS WANTED

An efficient suggestion scheme can boost morale —and profits

— by **KENRIC HICKSON**

MASS production and, more recently, automation, has meant that pride in work and satisfaction of a job well done has been lost to many workers.

They must, of necessity, be content to do the job and pick up the pay-packet at the end of the week.

Anything which can be done to restore the worker's pride in his product is infinitely worth while, and one method of helping to bring this about is a suggestion scheme.

Ideas are vital to the health of an industry, and such a scheme (if well run) will help the worker feel less remote and do much to improve the relationship between management and employees.

The need for co-operation was brought home to industry by the war, and today this need is no less urgent. Unfortunately, some employers, while recognising the value of such a scheme, delay its introduction because of uncertainty regarding its reception in the factory.

There is no need for this anxiety. Experience has shown that where a scheme is carefully planned, and fully explained to employees from the start, it will usually be accepted with enthusiasm. The difficulty will be to maintain that initial interest.

Sometimes, especially during the early stages, workers are reluctant to submit ideas because of suspicion of the management. They are afraid their ideas may be pirated or that the resultant increase in productivity might put themselves, or their workmates, out of work.

This may be overcome by guaranteeing that no one will be out of work as a result of a suggestion scheme improvement—one firm has guaranteed that anybody laid off through a suggestion improvement will have a holiday (with pay) until he is re-absorbed by the company!

Most firms have suggestion-boxes, into which the ideas may be dropped; but some firms, feeling that certain employees might be embarrassed if seen dropping their suggestions in the box, are quite ready to receive ideas through the internal mail or ordinary postal services.

Usually an envelope, bearing the name and address of the appropriate executive, is available for this purpose. It is usual for a joint committee of management and workers to be appointed to consider suggestions.

For best results, and to maintain enthusiasm, the suggestion-box should be emptied frequently, and ideas should go before the suggestion committee as soon as possible.

Workers should be invited to seek help, when in difficulties, in writing out their suggestions. If the idea involves the drawing of a plan or making a model, the necessary help should be available from the drawing-office.

The shy or nervous employee should have the opportunity to remain anonymous if he wishes, and some firms have numbered suggestion-forms with a perforated strip (bearing the same number) which may be torn off and kept by the employee. If accepted, he can later be notified by the notice-board.

It is important that, once the decision has been reached, the worker should be informed as quickly as possible. If his idea is rejected, common sense demands that the letter informing him of this should be phrased in a manner likely to cause the least disappointment.

Sometimes workers are invited to meet the personnel officer, or other executive, to discuss reasons for failure.

The names of the authors of successful ideas should be posted on the notice-board. In fact, good publicity about awards is an excellent form of encouragement.

One London firm now prints the names of the authors of suggestions in their brochure which is sent to customers, and, as a result, the number of suggestions has more than doubled, a further proof of the worker's latent pride in his work.

In deciding the amount of the award, the committee gives due regard to the total annual saving to the firm likely to result from adopting the suggestion; but this is not the only factor, and the ingenuity of the suggestion is also taken into account.

Special awards for merit may also be made for good ideas which, for some reason, cannot be adopted.

Some firms make additional awards at the end of each year. Joseph Lucas (a firm which receives an average of one suggestion every half-hour of the working day) makes an additional award of £250 for the best suggestion of the year.

In a recent review one suggestion was considered to be so outstanding that the sum was increased to £500. Like all such awards, the payment was tax free.

For forty years this firm has maintained a successful suggestion scheme which commands a high level of enthusiasm from its workers.

In 1959, 20,500 suggestions were received from 36,600 employees, and 7,672 were adopted. The total paid out was £43,752.

The real value of the scheme cannot be measured in terms of money but lies in the fact that every other worker is thinking about his job and how it might be done more quickly, more cheaply, and to better effect.

A further result is that workers in this factory are more ready to accept any changes in production methods which the company may wish to make.

A worker does not need to have technical knowledge to win an award, as was shown by a dispatch clerk with a firm of instrument manufacturers. He kept records over a period and noticed that his firm spent more on insuring parcels than was recovered on lost ones.

He suggested that this practice should cease, and earned the near-record sum of £1,000.

Recently, a worker with the Goodyear Tyre Co. was irritated by having to stop his machine to hand-fix a piece of rubber. He evolved a simple device to save the wasted minutes, and his invention gained an award of £100.

A maintenance fitter with Kodak designed a special pair of tongues to facilitate the handling of camera-cases when being sprayed.

This cut out delay while waiting for the case to dry, giving a better flow of work on the assembly line, and earned the man a useful award.

A Hoover worker thought of using one clip, instead of two, to join flexible cleaning hoses. Prototypes were made and thoroughly tested and were found not only to work just as well but also to be easier to operate. He was awarded £31.

One woman factory worker had the idea of putting nail-polish on to the edge of a high-speed conveyor belt to stop it fraying.

Her employers adopted the suggestion and substituted lacquer for the nail-polish.

Suggestion schemes vary greatly in scope, efficiency, and achievement.

In 1959, the Industrial Welfare Society (a voluntary association which has done valuable work in this field and now publishes a bi-monthly newsletter—"Suggestion Scheme News") made a survey of 226 schemes, which showed that, from a total of 735,056 employees, just over 128,113 sent in ideas—or about 17 suggestion per every hundred persons.

Nearly 37,376—or 29 per cent—were accepted, and the total paid in awards was £172,002—an average of nearly £5 per person.

The survey provided conclusive evidence that a good suggestion scheme is very much worth while. A well-run scheme represents an excellent investment and can result in considerable saving over the years. It benefits employer, employee, consumer, and the nation at large.

In addition there are the intangible benefits of improved labour relations and a means of outlet for the workers' pride in achievement—but the scheme must be well run, and this means devoting time and effort to making it a success.

The International Laundry Exhibition

PROGRESSIVE MACHINES LAUNCHED IN PARIS

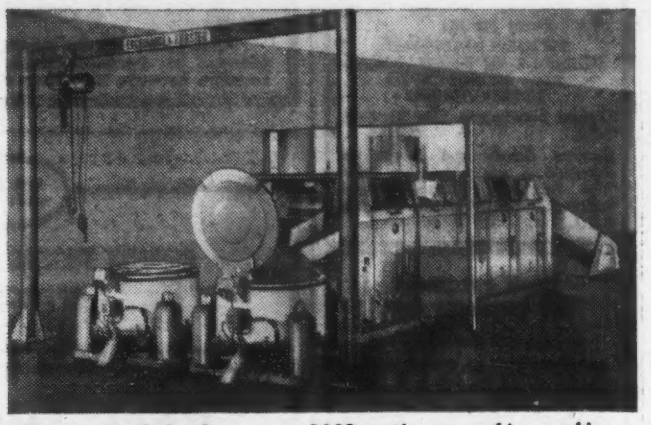
EXHIBITORS at the Salon International de L'Equipment Blanchisserie-Teinturerie which was held at the Parc des Expositions, Porte de Versailles, Paris, recently, came from many European countries and the U.S.

FROM OUR OWN CORRESPONDENT

Most of the exhibits were of the accepted design and construction. The main trend in the dry-cleaning section was towards machines of smaller type for coin-operation.

It was on the laundry side that the greatest change was noticeable. On the stand of Engelhardt & Förster of Bremen, a new approach to continuous washing was demonstrated and judging from the continual stream of visitors this plant has made some impact on the industry.

Designated as R100, the continuous washing machine is built up from five or more units. Each unit differs from the conventional washing machine in that it possesses the characteristics of a drum washer.



The "star" of the show — an R100 continuous washing machine manufactured by Engelhardt & Förster of Bremen.

except that the rotating drum is replaced by a revolving paddle, claimed to give a more thorough washing action. A transport bucket transfers the work from one unit to the next.

The loading of the fully automatic R.100 is carried out by a conveyor belt. Nets, filled with 22-26lb of soiled articles, are placed into sections of the conveyor and unload themselves into the unit for pre-wash at regular intervals.

All units work in synchronisation; as a load of soiled work is fed by the conveyor belt into the first unit, a load of clean work is discharged by the last unit into the hydroextractor.

The conveyor may lead either from the side or from behind into a container placed on top of the first unit.

This is claimed to be of advantage to hospital laundries as the continuous washer may be installed through a separation wall, dividing the laundry into a clean and soiled section. Thereby preventing cross-infection by air and by direct contact of clean and infected laundry.

According to the size of the plant the steam consumption varies from 0.4 to 0.6 lb./lb. dry-weight. Water consumption is up to 1¼ gal./lb. dry-weight and the electrical connection required is 3kW plus 1kW per unit.

The required installation width is 5ft. 2in. with a length of 3ft. 8in. for each unit plus 3ft. extra.

Finishing plant at the Exhibition was also of the conventional type, with one exception, this being the Robot Press, an automatic pressing machine developed for finishing pillowcases, serviettes and other small flat-work articles.

The machine consists of two presses arranged one behind the other, the work being fed through them by means of an intermittently running conveyor belt; a turnover unit being provided between presses, and another turnover unit being located after the second press in order to stack the finished articles or to feed them on to an automatic folder.

The intermittent movement of the conveyor bands and the opening and closing of the presses is controlled by means of a pre-set electrical timer.

During operation the operator lays the leading edge of an unprepared article on the beginning of the first conveyor band. The band starts and moves this article, positioning it under the first press so that the leading edge is pressed.

The operator then finally completes the lay of the article whilst the front edge is held, and positions a second article on the beginning of the conveyor bands.

The conveyor then automatically positions the article completely under the first press, nipping the leading edge of the second article as before. When the first article has been under the press for the pre-set time interval, it is then moved to the second press for the reverse side to be finished.

It is claimed that by the use of this equipment, training of operators is greatly simplified, while at the same time producing high quality work.

The machine is suitable for siting adjacent to an existing calender, and will then give the same work flow to the small articles as the main calender work.

Vibration testing simplified by new instruments

FOUR pieces of equipment for the measurement of vibration and the study of components subjected to vibration have been introduced recently by Dawe Instruments Ltd. They are: a calibration unit, a control amplifier, a vibration meter adapted for gas turbine work, and a variable-phase stroboscope unit.

Type 1436 Vibration Calibrator consists of a small moving-coil vibration generator and stand producing vibration at an acceleration level of 10g. Setting is by means of an optical calibrating plate on which two circles are inscribed. The calibrator is adjusted until three circles are visible, and acceleration is then exactly 10g.

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Slow-motion examination of a vibration test using the Vari-phase Strobe unit.

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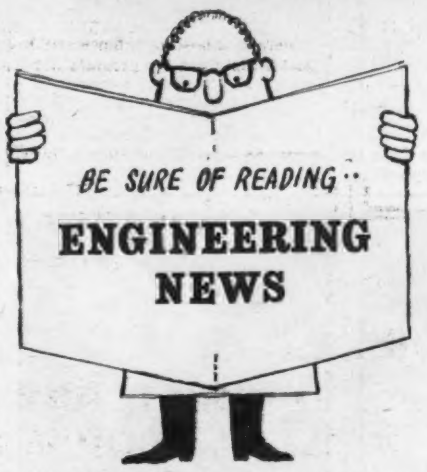

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U.K. GETS 72in. LAPPING MACHINE

Improved smaller unit available

EUROPE'S largest lapping machine, the 72-in. Lapmaster, so far available on the Continent, is to be marketed in the UK by Payne Products International Ltd., of Slough, Bucks.

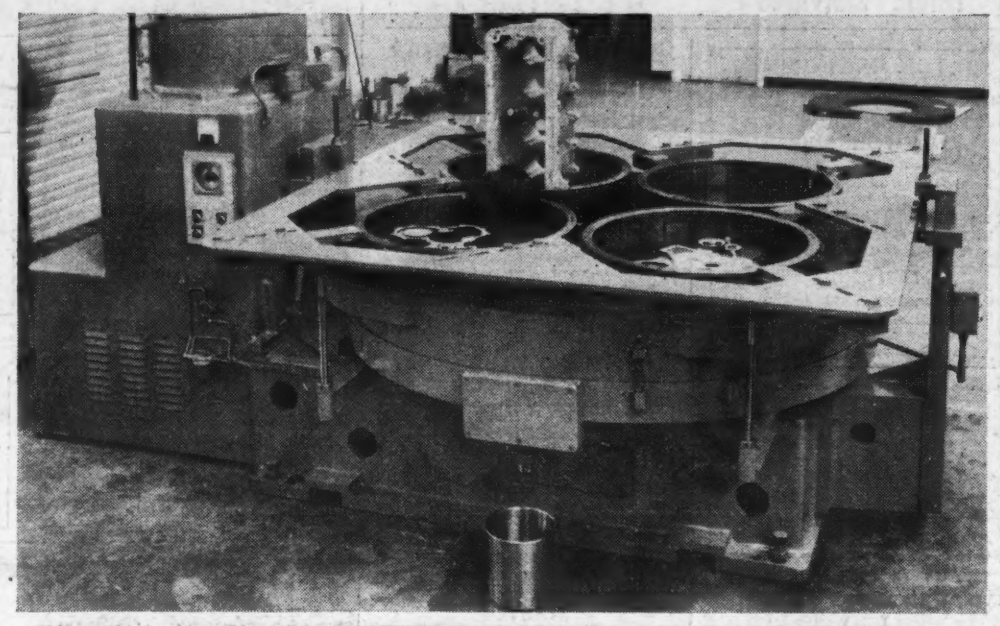
Improved methods of diecasting aluminium and cast iron make it economical to lap large castings after a minimum of previous machining and in many cases to transfer the rough castings straight to the lapping machine.

There are four working stations in which four components, with face dimensions of up to 27¼in. can be lapped in one operation.

For special applications, with the working stations removed, a casting whose greatest face dimension does not exceed 52in. can be lapped.

The lapping plate speed is 42 rev/min and it is driven by a 20 h.p. motor.

An improved version of the same firm's 48-in. lapping machine of British design and manufacture is now available. This machine is provided with multiple abrasive feeds to the lap plate which ensures an even distribution over the entire surface of the plate.



This machine with a 72in. diameter plate can lap accurate flat surfaces on four components simultaneously.

BRITISH PAPER SORTER

AFTER several years of research, Simmons & Thompson (Automation) have built the first British automatic paper-sorting machine.

To date, paper mill productivity has been hampered by the inflexible output of trained hand-sorters used to detect faults.

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This new automatic paper-sorter has a normal working speed of 10,000 an hour for a sheet up to 45in. x 70in.

A stream feeder has been developed for use with a rising feed pile. Three suction heads of the feeder automatically adjust themselves to variations in the pile level.

Optical system

Double-feeding is no longer a problem. Grippers carry the sheet — at the same speed as the main gripper chain—along the machine and under the optical system of the flaw detector.

One of the main features of the machine is the J. F. Crosfield's "Pamotron" electronic and optical scanning system. The flaw detecting mechanism signals a faulty sheet on an oscilloscope. The height or magnitude of "blips" indicates the severity of the flaw. Once the flaw is signalled, a solenoid operates a cam on a reject hopper.

An electronic "eye" controls the main delivery hoppers.

Refinements

The "Pamotron" has two horizontal lines across the oscilloscope, which can be varied in height according to the significance attached either to a single gross flaw or a predetermined number of lesser blemishes in the paper passing inspection.

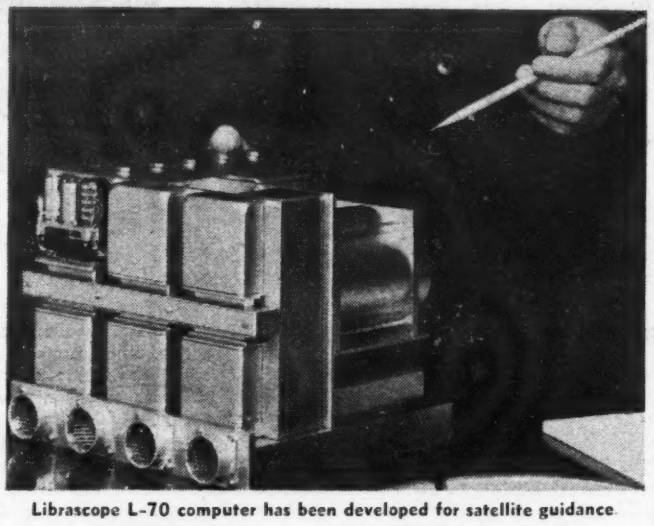
Further refinements are the various noise-filtering cells, adjustable to select faults such as calender creases, dandy picks, small peppery spots and cutter creases.

This paper-sorter, 51ft. long and 9ft. 6in. wide, with its master console controls, requires only two operators. It will displace some two dozen trained hand-sorters; free valuable mill space; and reverse a long standing paper-handling problem of having to gear output to human limitations.

SCOTS DIESELS FOR GERMANY

TWELVE diesel engines made at Shotts, Lanarkshire factory of the Cummins Engine Co. have recently been sold and delivered to the German shipyard, Bayrische Schiffsbaugesellschaft of Erlenbach, Main, in the face of intense Continental competition.

The engines are the model NTRO-6-M which develops 254 b.h.p. at 1,860 rev./min. They have been installed in six 68ft. patrol boats.



Librascope L-70 computer has been developed for satellite guidance.

Computer 'memory' has gas bearing

ONE of the world's smallest computers, the Librascope L-70 announced this week by General Precision Inc., of Glendale, California, weighs only 19lb. and makes use of a new design concept—a gas bearing to support the magnetic drum acting as the "memory".

The L-70 is intended for satellite flight guidance and has been evolved from an earlier model, the Librascope Centaur.

It weighs 50 per cent less than the Centaur, however, and has a greatly increased memory capacity. Overall dimensions are 8½ by 10 by 8in.

A thin film of helium is employed to support the memory drum while it is rotating inside its shroud.

Use of the gas bearing permitted the clearance between drum and heads to be reduced from 0.001in. to 0.00015in. and this is one of the factors in the increased capacity of the drum.

No wear

Mechanical wear is virtually eliminated and there is a great reduction in vibration and flexibility. Recording tracks are spaced on 0.045-in. centres, allowing 70 tracks to be accommodated in a space of only 3.7in.

The memory system is hermetically-sealed and has been designed to withstand severe shock and vibration. Initial storage capacity is 112,000 bits but this figure can be improved on. The weight of the entire system is about 5lb.

U.S. TEST GREASES

STUDIES made by the U.S. Army Ordnance Corp have shown that greases may not mix even though they meet the same specification.

One of the reasons is that lubricating greases can interact and affect bearing performance life as well as other grease properties.

In tests of twelve types, compatibility was measured by the hardening or softening displayed by a mixture.

After 1,261 such tests 25 per cent. were found to be incompatible with a preponderence of softening cases.

The tests also indicated that sodium soap and mineral oil greases mix well, while blends of hydrophobic silica and mineral oil types were the most incompatible.

WEAVERS TOLD OF MONITOR

WHAT is believed to be the first address in Britain on the Hasler system of production monitoring was recently given by Mr. J. C. Hilton, of A. S. Orr and Co. Preston, at Blackburn Technical College to business executives and union officials in the cotton industry.

With this system, the information to be monitored is fed into six identical units, each covering 96 looms.

Efficiency is recorded on a moving graph every three seconds, and the panel registers the total time of each weaver's section.

Shed efficiency

"In order to reduce machine interference time on the loom stops, the 'plan system' has been adopted," Mr. Hilton told Engineering News. "Each section of looms has a series of illuminated numbers which indicates to the operatives the shed efficiency relative to the target efficiency.

"Since the efficiency is computed almost immediately it is possible to provide concentrated help in order to get looms running and so bring efficiency back to target.

"The trade union reaction to the installation of this system has been very favourable as they are assured that the interests of their members are being safeguarded."

$15m. centre for Asian research

ASIA'S biggest private research centre—cost 15 million dollars—was opened this week in Kawasaki, near Tokyo.

Built by the Tokyo Shibaura Electric Co. (Toshiba), it will undertake research in all phases of light and heavy manufacture, including various metals, chemicophysics, atomic power, electronic tubes and semi-conductors, general electronics, high voltage and insulation problems, and machine tools.

Mr. Taro Kuraishi, Toshiba's vice-president and director of the new centre, said that Toshiba was investing 15,280,000 dollars in the construction of the building alone, which occupies 452,000 square feet.

"We are planning to invest a further 3,333,000 dollars for research purposes," he added. "This will represent an investment of 11,000 dollars for each of 300 research specialists and scientists who will form the nucleus of the staff of the centre."

EIA stages 24-hr. show

THE Engineering Industries Association staged its first regional one-day display of engineering products and processes in the Edinburgh Suite, Belle Vue, Manchester, on Tuesday.

It was opened by Mr. H. Cobden Turner, North West regional chairman.

Exhibits from fifty-five firms ranged from small specialised components to large machines and equipment.

Mr. G. Aplin, North-West organiser of the Engineering Industries Association, told Engineering News:

"This display gives members the opportunity to show their products and processes at a very small cost and, from the immediate and extraordinary response it aroused, it is obvious it has had a tremendous appeal."

LATE NEWS

TEMple Bar 3422

Last night, speaking at the N.W. Middlesex Branch of the British Institute of Management, Mr. Landon Goodman advocated a department of automation representing management, trade unions, and the government, to deal with early problems and to speed introduction of automation.

* From front page

Pedal-Planes

Southampton, Hatfield and Southend, and are entitled to apply for grants from the Royal Aeronautical Society (R.Ae.S.) of up to £1,500 each.

Mr. B. A. Kerry leads the Southend man-powered aircraft group who expect to begin trials with their two-seater machine in two to three months.

Secretary of the group, Mr. A. C. Drescher, told Engineering News that there are 25 members most of whom are model aircraft enthusiasts.

Development was started two years ago on their machine which will have a wing span of 90ft. and an unloaded weight of 146lb.

In this case propulsion will be through a tractor-propeller as with conventional aircraft.

The Southampton University flight was achieved with an 80ft. span, 130lb. machine.

Power for the aircraft is by pedal drive to an 8ft. diameter pusher-propeller mounted on a pylon.

Hatfield Man-powered Aircraft Club claimed that their machine, The Puffin, covered the distance at a height of about 6ft. This machine has a pedal-driven tail propeller.

Design team for The Puffin is led by Mr. John Wimpenny, deputy chief aerodynamicist of de Havilland's.

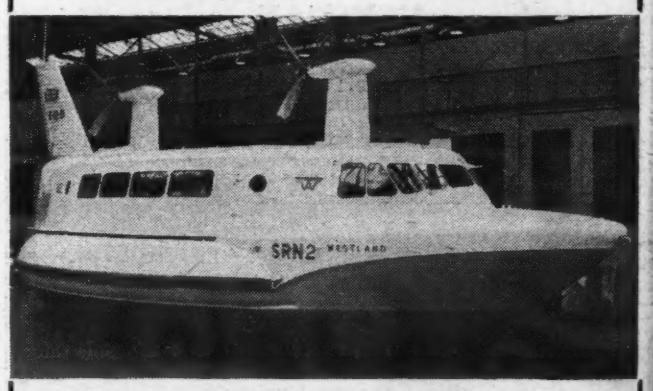
Board factory for Norfolk

CONSTRUCTION has started at Thetford, Norfolk, on the new £1.3 million factory for Novoboard (U.K.) Ltd. It is hoped the factory will be in production by the end of next year.

The plant should provide employment for 250 people.

Novoboard is a wood particle board of three-ply construction with a wide variety of uses.

HOVERCRAFT SRN.2 BEGINS TRIALS



BRITAIN'S most advanced hovercraft, the SRN.2, built by the Saunders-Roe division of Westland Aircraft, left its hangar last Monday for initial engine trials.

Fitted with four Blackburn Nimbus gas turbines, each of 815 h.p., the craft is expected to cruise at 80 m.p.h. with 66 passengers, over a 200-mile range.

It is primarily an operational research machine and will be used on experimental routes to determine operating capabilities. Hover height will be between 18 and 20in.

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